MINISTRY OF ECONOMIC AFFAIRS
ADM. MINES - GEOLOGICAL SURVEY OF BELGIUM
13 Jennerstreet - 1040 Brussels - Belgium

INTERNATIONAL SYMPOSIUM ON

NAMUR 1974

BELGIAN MICROPALEONTOLOGICAL LIMITS

FROM EMSIAN TO VISEAN – SEPTEMBER 1st to 10th

GENERAL INFORMATION

GUIDEBOOK

Edited by

J. BOUCKAERT & M. STREEL

INTRODUCTION

The purpose of this field-trip guidebook to the Ardennes-Massiv is to present participants with the opportunity to visit and to collect the best now available (1974 (x) micropaleontological material from Emsian to Visean rock-sequences.

Among the localities to be visited, there are several that where originally used by former stratigraphers to establish the classical Belgian stratigraphy wich is a standard for the Middle- and Upper Devonian, and Lower Carboniferous.

The writing of this guidebook is the result of a team-work, assumed by a micropaleontological working group named "Center for Biostratigraphy, Micropaleontology and Palynology, F.R.F.C. - F.K.F.O. (xx)", sponsored by the Fonds National de la Recherche Scientifique.

(x) The arrangement with detachable pages is provided with the hope that we shall be able in the future to replace mistaked or out of date informations by new ones.

(xx) Fonds de la Recherche Fondamentale Collective
Fonds voor Kollectief Fundamenteel Onderzoek.

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The long, tedious chore of compiling and checking all the contributions and the preparation for printing was done by Mister A. THEYS of the Service Géologique tho whom we are most grateful.

PRESENTATION OF THE GUIDEBOOK

The aim of this guidebook is to provide biostratigraphical data based on microfissils, with an as far as possible unified terminology.

For that reason one have tried to introduce standardized symbols not only for lithology but also for fossil-groups, and last but not least for the different correlation lines.

In addition we have also introduced Micropaleontological guiding-marks M.g.m.), in order to establish the presently known sequence of our biostratigraphical data.
In this guide book we used M.g.m. only for the purpose to clarify the presentation of data and not at all as a new biostratigraphical zonation.

The ranges of characteristic microfossils have been compiled and are presented in the five following charts.

These charts are divided in four parts linked by dotted lines (signifying lateral projection of limits).:

From the top to the base of each chart :

1) stratigraphic range of visited sections

2) formal or provisional zonation

3) distribution of characteristic microfossils

4) micropaleontological guiding-marks (M.g.m.)

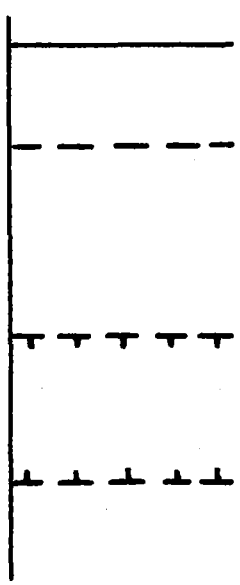
1) Stratigraphical range of visited sections

Each ranging black line carries the excursion letter (A to I) and the number refering to the locality.
Some of these black lines also carry the traditionnal belgian stratigraphical connotations used on the geological maps.
These connotations ought to refer to chronostratigraphical subdivisions of a stage but were, in fact, more often used in the literature as lithostratigraphical or/and biostratigraphical units.
These connotations are here used only in order to help the reader in locating the data along the traditionnal stratigraphic schema.
We have followed MAILLIEUX 1928, DEMANET 1928, and BOUCKAERT, STREEL, THOREZ 1968.

2) Formal or provisional zonations

- *Formal zonation is given with author's abbreviation and publication date.*

Not id. g. sp. — *indicates that this zone is not recognized by presence of guide species.*



precise limit

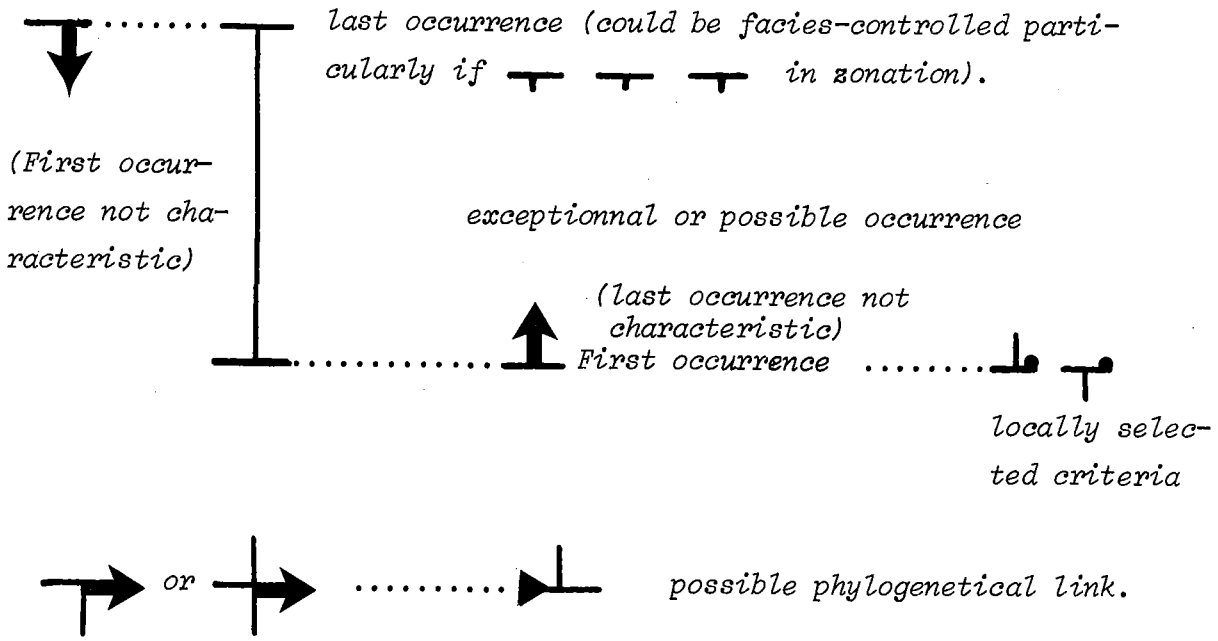
unprecise limit due to lack of bio-characteristics or to succession of bio-characteristics not occuring in a given section.

upper limit due to presence of unfavorable lithological facies, above ~~and below~~

lower limit due to presence of unfavorable lithological facies, ~~above and~~ below.

3) Distribution of characteristic microfossils

Because zones are of several types (eg. concurrent range zones, zones based on abundance, ...) local criteria based on first (sometimes on last) occurrence have been selected.



4) Micropaleontological guiding-marks (m.g.m.)

Each m.g.m. is based (or) on one single fossil group with possibly more than one species within this fossil group.

LIST OF VISITED SECTIONS

EXCURSION A

Guides : CONIL R. , PIRLET H. (Leader)

1. *Lives*
2. *Tramaka*
3. *Samson*
4. *Yvoir-road*
5. *Warnant*

EXCURSION B

Guides : CONIL R., GROESSENS E. (Leader)

1. *Yvoir - railway station*
2. *Yvoir-road*
3. *Dinant-Bastion*
4. *Dinant-Bayard*
5. *Freyr*
6. *Salet*
7. *Denée*

EXCURSION C

Guides : BOUCKAERT J., CONIL R. (Leader), GROESSENS E., STREEL M., SANDBERG C.

1. *Anseremme - railway bridge*
2. *Hastière - Sentier des Vignes*
3. *Maurenne*
4. *Gendron - Celles*
5. *Royseux*
6. *Ocquier*
7. *Petit Modave*
8. *Les Avins*

EXCURSION D

Guides : BLESS M., BOUCKAERT J., CONIL R., DREESEN R., GROESSENS E., STREEL M., THOREZ J. (Leader)

1. *Comblain la Tour - quarry*
2. *Comblain au Pont - Beverive*
3. *Comblain au Pont - Bon Mariage*
4. *Rivage - Belle Roche*
5. *Rivage quarry*
6. *Chanxhe*
7. *Poulseur - road*
8. *La Gombe - Montfort quarry*
9. *Poulseur Château*
10. *Souverain-Pré - station*
11. *Esneux*
12. *Evieux*

EXCURSION E

Guides : COEN M., BULTYNCK P., PEL J. (Leader)

1. *Givet - Mont d'Haurs*
2. *Pondrôme*
3. *Wellin*
4. *Ave et Auffe*
5. *Marenne*
6. *Mesnil*
7. *Hotton*
8. *Ny*

EXCURSION F

Guides : MOURAVIEFF A.

1. *Fromelennes*
2. *Nismes*
3. *Frasnes - Railway cut*
4. *Frasnes - Lion quarry*
5. *Frasnes - road*
6. *Neuville - Railway cut*
7. *Senzeilles*

EXCURSION G

Guides : BULTYNCK P., (leader), GODEFROID J.

1. *Couvin - Eau Noire*
2. *Couvin - Beguinage*
3. *Couvin - West*
4. *Couvin - Haine quarry*
5. *Nismes - 212*
6. *Halma - Père Finet*
7. *Halma - 7*
8. *Wellin - Fond des Vaux*
9. *Halma - 10*

EXCURSION H

Guides : CONIL R. (leader), GROESSENS E., STREEL M.

1. *Etroeungt - Carrière du Parcq*
2. *Avesnelles - Railway cut*
3. *St. Hilaire - Halte*
4. *St. Hilaire - Railway*
5. *Camp de César*
6. *Godin - quarry*

EXCURSION I

Guides : BOUCKAERT J., COEN H. (leader), COEN - AUBERT M., DUSAR M.

1. *Houyet - 5*
2. *Houyet - 6*
3. *Beauraing 53 - Railway cut*
4. *Sinsin*
5. *Noiseux*
6. *Hony*
7. *Hamoir Xhignesse*
8. *Hamoir Néblon*
9. *Durbuy*
10. *Barvaux*

GENERAL EXCURSION J

Guide : TSIEN H.H.

GENERAL EXCURSION K

Guide : CONIL R.

MACROFOSSILS


massive


lamellar


branching

} Stromatoporoid


massive

lamellar


branching

} Tabulate


massive


fasciculate


solitar

} Rugose


Trilobites


Bryozoa


Gasteropoda


Brachiopoda
Spiriferidae


Goniatites


Crinoids

MICROFOSSILS

	First occurence	® reworked	barren sample
Conodonts			
Ostracoda			
Foraminifera			
Algae			
Spores			
Acritarcha			
Tentaculitida			

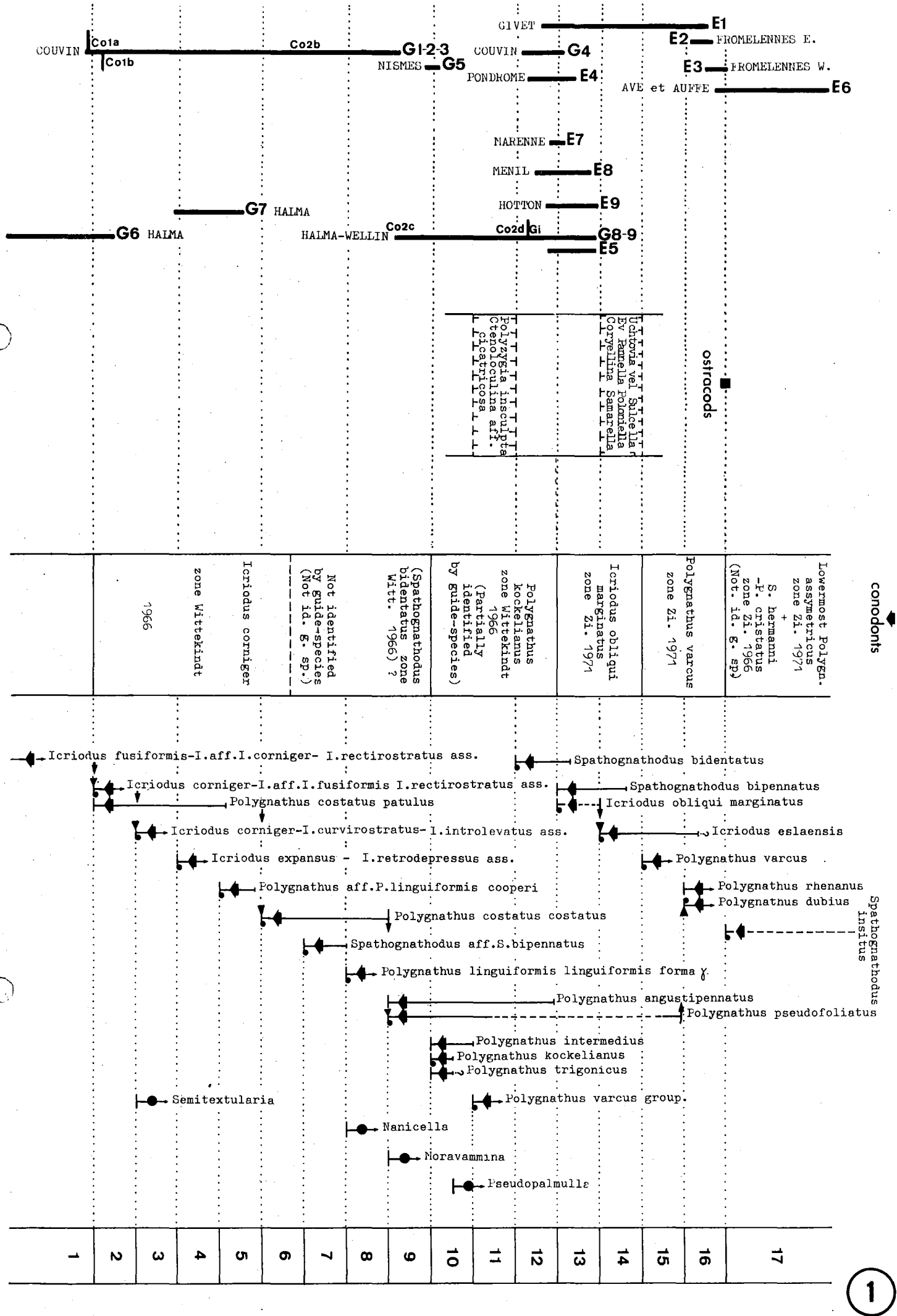
CORRELATION LINES

precise limit in a succession of bio-characteristics

correlation by similarity of bio-characteristics

lithostratigraphic correlation line

here


COUVIN
Co1a
Co1b
Co2b
G1-2-3
NISMES
G5
G1VET
E1
E2
FROMELENNES E.
COUVIN
G4
E3
FROMELENNES W.
PONDROME
E4
AVE et AUFFE
E6
MARENNE
E7
MENIL
E8
HOTTON
E9
G7 HALMA
G6 HALMA
HALMA-WELLIN
Co2c
Co2d
Gi
G8-9
E5
ostracods
Uchtovia vel Sulcella r
Ev Pannella Polomiella
Coryellina Samarella
Polyzygia insculpta
Ctenoloculina aff.
cicatricosa
Lowermost Polygn. assymetricus zone Zi. 1971 + S. hermanni -P. cristatus zone Zi. 1966 (Not. id. g. sp)
Polygnathus varcus zone Zi. 1971
Icriodus obliqui marginatus zone Zi. 1971
Polygnathus kockelianus zone Wittekindt 1966 (Partially identified by guide-species)
(Spathognathodus bidentatus zone Witt. 1966) ?
Not identified by guide-species (Not id. g. sp.)
Icriodus corniger zone Wittekindt 1966
conodonts
Icriodus fusiformis-I.aff.I.corniger- I.rectirostratus ass.
Icriodus corniger-I.aff.I.fusiformis I.rectirostratus ass.
Polygnathus costatus patulus
Icriodus corniger-I.curvirostratus- I.introlevatus ass.
Icriodus expansus - I.retrodepressus ass.
Polygnathus aff.P.linguiformis cooperi
Polygnathus costatus costatus
Spathognathodus aff.S.bipennatus
Polygnathus linguiformis linguiformis forma γ
Polygnathus angustipennatus
Polygnathus intermedius
Polygnathus kockelianus
Polygnathus trigonicus
Semitextularia
Nanicella
Noravammina
Pseudopalmulla
Spathognathodus bidentatus
Spathognathodus bipennatus
Icriodus obliqui marginatus
Icriodus eslaensis
Polygnathus varcus
Polygnathus rhenanus
Polygnathus dubius
Spathognathodus insitus
Polygnathus pseudofoliatus
Polygnathus varcus group.
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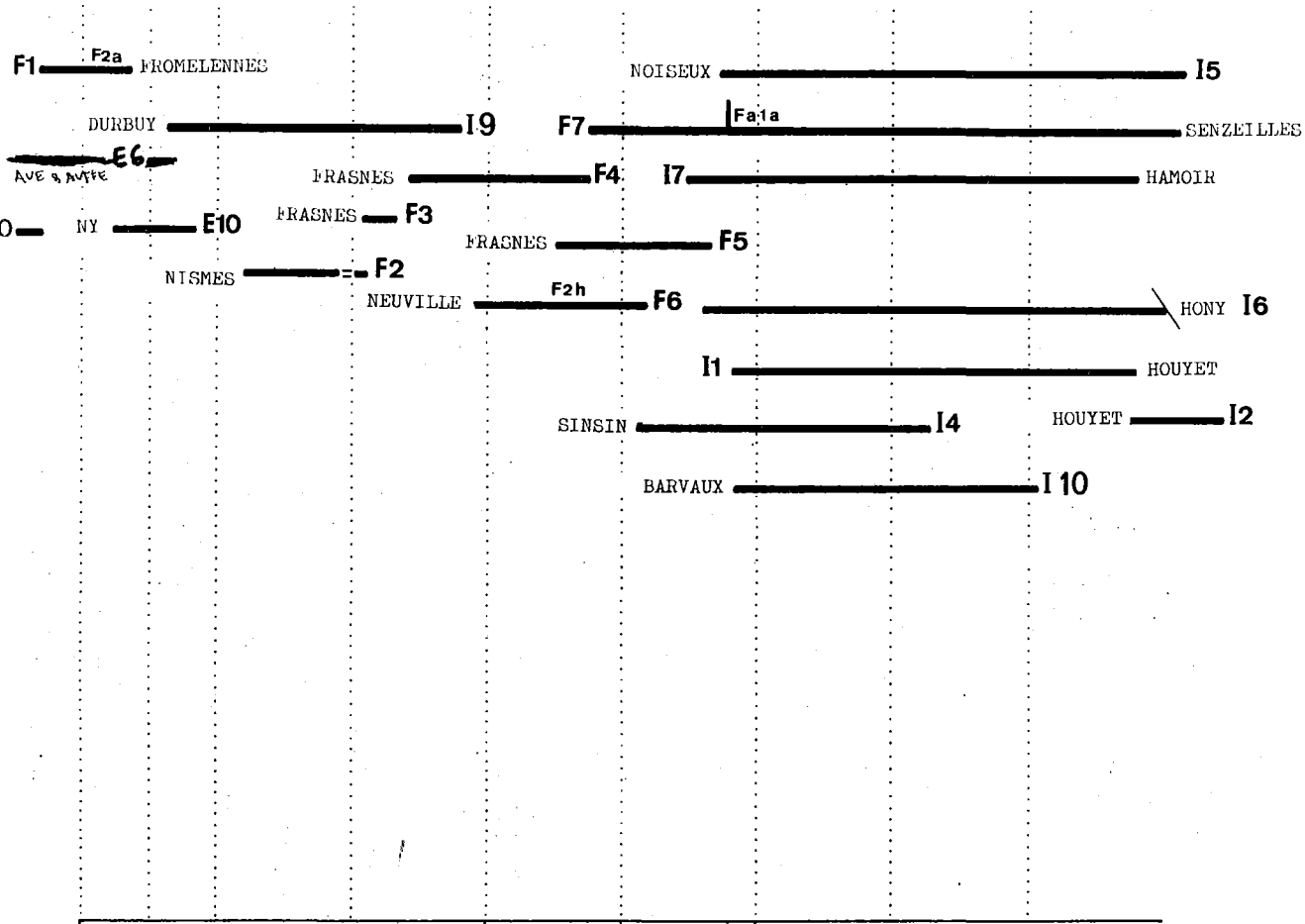
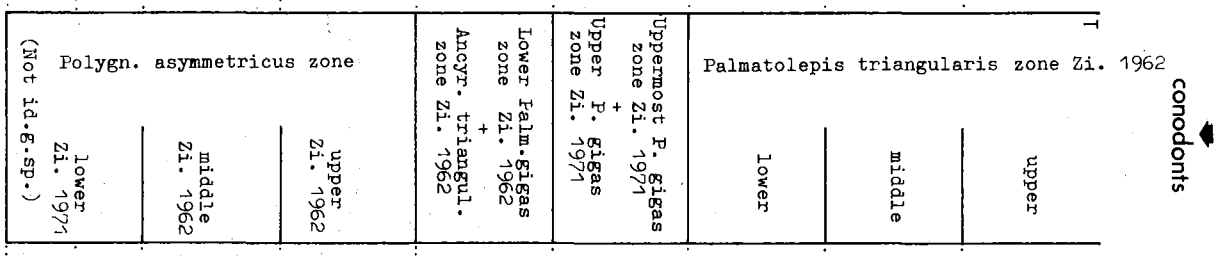
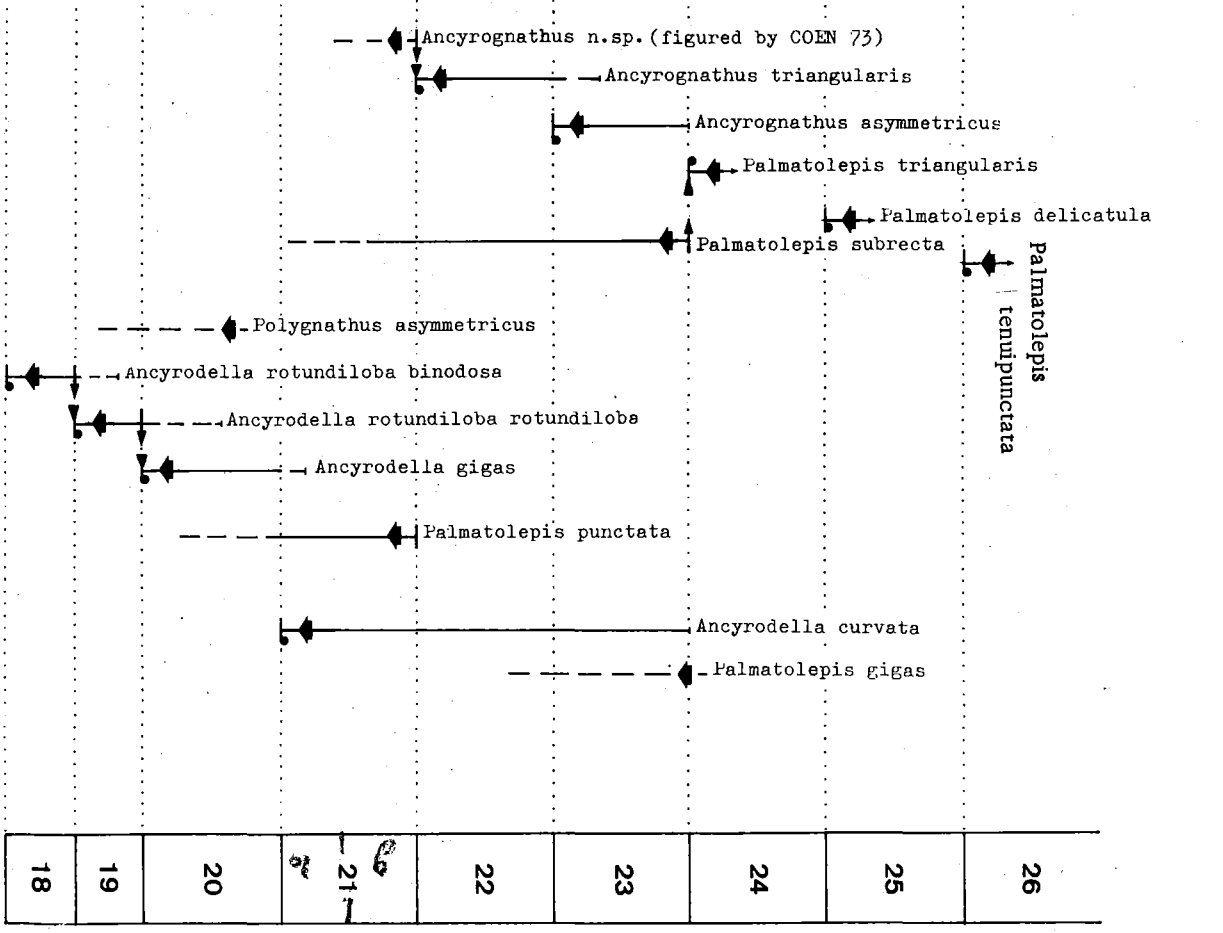

F1
F2a
FROMELENNES
NOISEUX
I5
DURBUY
I9
F7
Fa1a
SENZEILLES
E6
AVE & NAUTE
FRASNES
F4
I7
HAMOIR
NY
E10
FRASNES
F3
FRASNES
F5
NISMES
F2
NEUVILLE
F2h
F6
HONY
I6
I1
HOUYET
SINSIN
I4
HOUYET
I2
BARVAUX
I 10


Polygn. asymmetricus zone
lower Zi. 1971 (Not id.g.sp.)
middle Zi. 1962
upper Zi. 1962
Lower Palm.gigas zone Zi. 1962 + Ancyr. triangul. zone Zi. 1962
Uppermost P. gigas zone Zi. 1971 + Upper P. gigas zone Zi. 1971
Palmatolepis triangularis zone Zi. 1962
lower
middle
upper
conodonts


Ancyrognathus n.sp. (figured by COEN 73)
Ancyrognathus triangularis
Ancyrognathus asymmetricus
Palmatolepis triangularis
Palmatolepis delicatula
Palmatolepis subrecta
Palmatolepis tenuipunctata
Polygnathus asymmetricus
Ancyrodella rotundiloba binodosa
Ancyrodella rotundiloba rotundiloba
Ancyrodella gigas
Palmatolepis punctata
Ancyrodella curvata
Palmatolepis gigas

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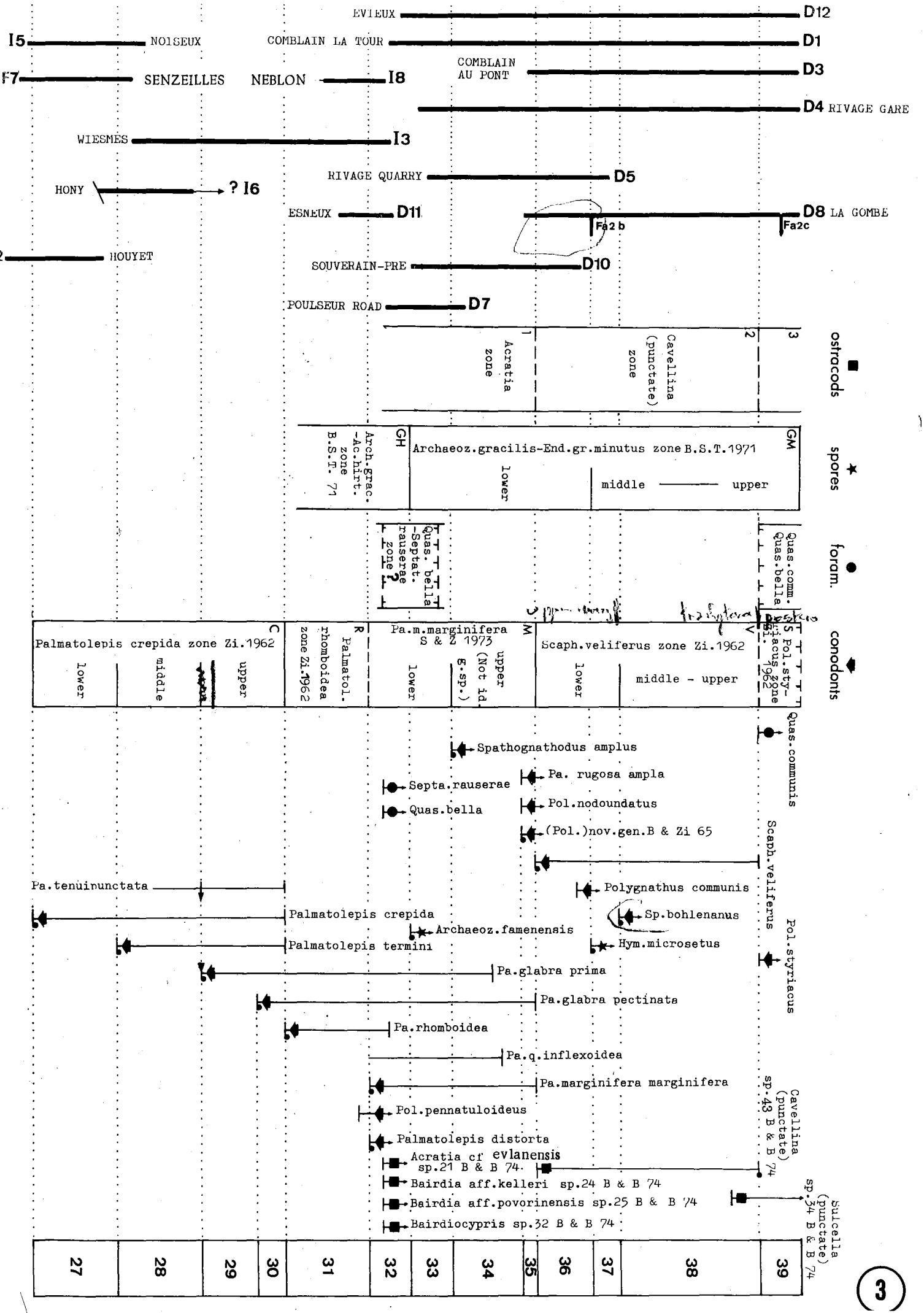
EVIEUX
D12
I5
NOISEUX
COMBLAIN LA TOUR
D1
COMBLAIN AU PONT
D3
F7
SENZEILLES
NEBLON
I8
D4 RIVAGE GARE
WIESMES
I3
RIVAGE QUARRY
D5
HONY
? I6
ESNEUX
D11
D8 LA GOMBE
Fa2 b
Fa2c
HOUYET
SOUVERAIN-PRE
D10
POULSEUR ROAD
D7
ostracods
spores
foram.
conodonts
Acratia zone
Cavellina (punctate) zone
Archaeoz.gracilis-End.gr.minutus zone B.S.T.1971
lower
middle
upper
Arch.grac. -Ac.hirt. zone B.S.T. 71
Quas. bella -Septat. rauserae zone ?
Quas.comm. Quas.bella
Palmatolepis crepida zone Zi.1962
Palmatol. rhomboidea zone Zi.1962
Pa.m.marginifera S & Z 1973
(Not id. g.sp.)
Scaph.veliferus zone Zi.1962
Pol.sty- riacus zone Zi. 1962
Spathognathodus amplus
Septa.rauserae
Quas.bella
Pa. rugosa ampla
Pol.nodoundatus
(Pol.)nov.gen.B & Zi 65
Quas.communis
Scaph.veliferus
Pa.tenuipunctata
Palmatolepis crepida
Palmatolepis termini
Polygnathus communis
Sp.bohlenanus
Archaeoz.famenensis
Hym.microsetus
Pol.styriacus
Pa.glabra prima
Pa.glabra pectinata
Pa.rhomboidea
Pa.q.inflexoidea
Pa.marginifera marginifera
Pol.pennatuloideus
Palmatolepis distorta
Cavellina (punctate) sp.43 B & B 74
Acratia cf evlanensis sp.21 B & B 74
Bairdia aff.kelleri sp.24 B & B 74
Bairdia aff.povorinensis sp.25 B & B 74
Bairdiocypris sp.32 B & B 74
Sulcella (punctate) sp.34 B & B 74
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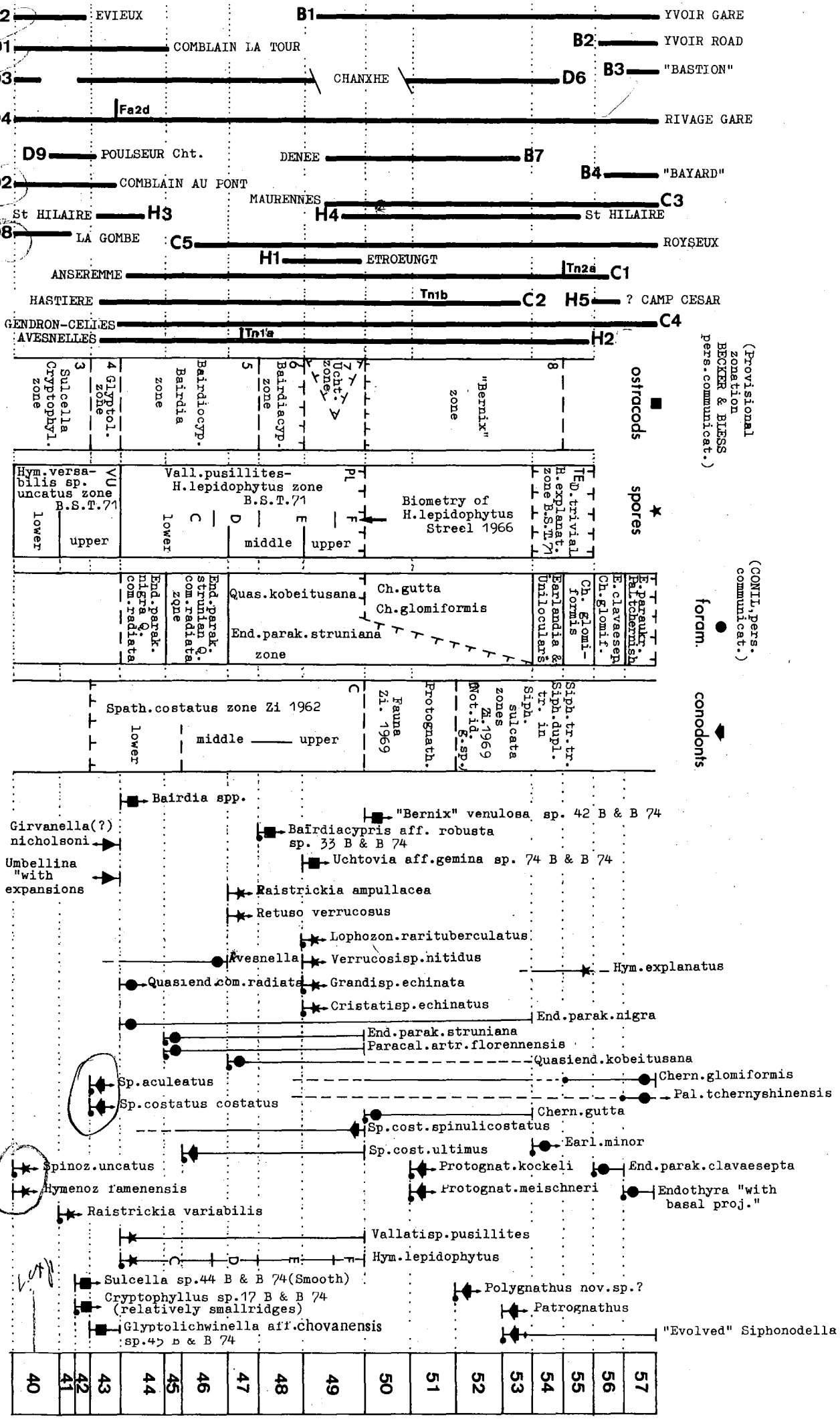
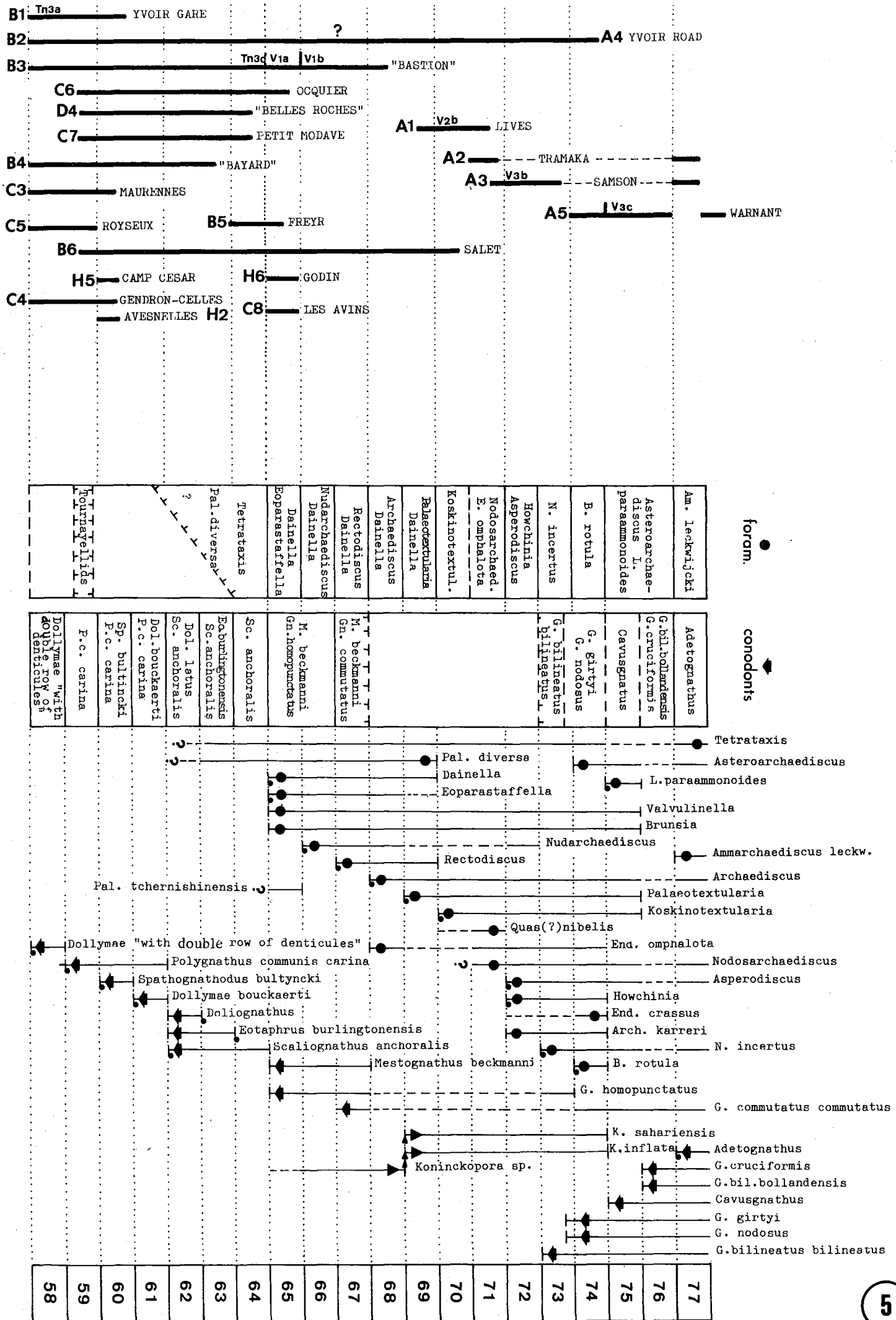

D12 EVIEUX
B1 YVOIR GARE
D1 COMBLAIN LA TOUR
B2 YVOIR ROAD
D3 CHANXHE D6
B3 "BASTION"
Fa2d
D4 RIVAGE GARE
D9 POULSEUR Cht.
DENEE B7
B4 "BAYARD"
D2 COMBLAIN AU PONT
MAURENNES C3
St HILAIRE H3
H4 St HILAIRE
D8 LA GOMBE
C5 ROYSEUX
H1 ETROEUNGT
ANSEREMME Tn2a C1
HASTIERE Tn1b C2
H5 ? CAMP CESAR
GENDRON-CELLES C4
AVESNELLES Tn1a H2
ostracods
spores
foram.
conodonts
(Provisional zonation BECKER & BLESS pers.communicat.)
(CONIL,pers. communicat.)
Sulcella Cryptophyl. zone
Glyptol. zone
Bairdia zone
Bairdiacyp. zone
Uchtovia zone
"Bernix" zone
Hym.versabilis sp. uncatus zone B.S.T.71
Vall.pusillites-H.lepidophytus zone B.S.T.71
Biometry of H.lepidophytus Streel 1966
H.explanat. zone B.S.T.71
D.trivial
Ch.gutta
Ch.glomiformis
End.parak.struniana zone
Earlandia & Uniloculars
Ch. glomiformis
E.clavaesep
Ch.glomif.
E.paraukr.
Pal.tchernish
Spath.costatus zone Zi 1962
Fauna Zi. 1969
Protognath.
Siph. sulcata zones Zi 1969
Siph.tr.tr.
Siph.dupl. tr. in
Bairdia spp.
"Bernix" venulosa sp. 42 B & B 74
Girvanella(?) nicholsoni
Bairdiacypris aff. robusta sp. 33 B & B 74
Umbellina "with expansions
Uchtovia aff.gemina sp. 74 B & B 74
Raistrickia ampullacea
Retuso verrucosus
Lophozon.rarituberculatus
Avesnella
Verrucosisp.nitidus
Hym.explanatus
Quasiend.com.radiata
Grandisp.echinata
Cristatisp.echinatus
End.parak.nigra
End.parak.struniana
Paracal.artr.florennensis
Quasiend.kobeitusana
Sp.aculeatus
Chern.glomiformis
Sp.costatus costatus
Pal.tchernyshinensis
Chern.gutta
Sp.cost.spinulicostatus
Earl.minor
Sp.cost.ultimus
Spinoz.uncatus
Protognat.kockeli
End.parak.clavaesepta
Hymenoz ramenensis
Protognat.meischneri
Endothyra "with basal proj."
Raistrickia variabilis
Vallatisp.pusillites
Hym.lepidophytus
Sulcella sp.44 B & B 74(Smooth)
Polygnathus nov.sp.?
Cryptophyllus sp.17 B & B 74 (relatively smallridges)
Patrognathus
Glyptolichwinella aff.chovanensis sp.45 B & B 74
"Evolved" Siphonodella
40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57


B1 Tn3a YVOIR GARE
B2 ? A4 YVOIR ROAD
B3 Tn3d V1a V1b "BASTION"
C6 OCQUIER
D4 "BELLES ROCHES"
C7 PETIT MODAVE
A1 V2b LIVES
A2 TRAMAKA
A3 V3b SAMSON
B4 "BAYARD"
C3 MAURENNES
A5 V3c WARNANT
C5 ROYSEUX
B5 FREYR
B6 SALET
H5 CAMP CESAR
H6 GODIN
C4 GENDRON-CELLES
AVESNELLES H2
C8 LES AVINS
Tournayellids
Pal. diversa ?
Tetrataxis
Eoparastaffella
Dainella
Nudarchaediscus Dainella
Rectodiscus Dainella
Archaediscus Dainella
Palaeotextularia Dainella
Koskinotextul.
E. omphalota
Nodosarchaed.
Asperodiscus
Howchinia
N. incertus
B. rotula
Asteroarchaediscus L. paraammonoides
Am. leckwijcki
foram.
Dollymae "with double row of denticules"
P.c. carina
Sp. bultincki P.c. carina
Dol. bouckaerti P.c. carina
Dol. latus Sc. anchoralis
Eo.burlingtonensis Sc.anchoralis
Sc. anchoralis
M. beckmanni Gn.homopunctatus
M. beckmanni Gn. commutatus
G. bilineatus bilineatus
G. girtyi G. nodosus
Cavusgnatus
G.bil.bollandensis G.cruciformis
Adetognathus
conodonts
Tetrataxis
Pal. diversa
Asteroarchaediscus
Dainella
L.paraammonoides
Eoparastaffella
Valvulinella
Brunsia
Nudarchaediscus
Ammarchaediscus leckw.
Rectodiscus
Archaediscus
Pal. tchernishinensis
Palaeotextularia
Koskinotextularia
Quas(?)nibelis
Dollymae "with double row of denticules"
End. omphalota
Polygnathus communis carina
Nodosarchaediscus
Spathognathodus bultyncki
Asperodiscus
Dollymae bouckaerti
Howchinia
Doliognathus
End. crassus
Eotaphrus burlingtonensis
Arch. karreri
Scaliognathus anchoralis
N. incertus
Mestognathus beckmanni
B. rotula
G. homopunctatus
G. commutatus commutatus
K. sahariensis
K.inflata
Adetognathus
Koninckopora sp.
G.cruciformis
G.bil.bollandensis
Cavusgnathus
G. girtyi
G. nodosus
G.bilineatus bilineatus
58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77

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NAMUR 1974

BELGIAN MICROPALEONTOLOGICAL LIMITS

FROM EMSIAN TO VISEAN – SEPTEMBER 1st to 10th

EXCURSION A

Guides :

CONIL R.

PIRLET H. (leader)

GUIDEBOOK

Edited by

J. BOUCKAERT & M. STREEL

Middle and upper Visean.

A1. Lives.

This quarry forms the "locus typicus" of the upper part of the middle Visean, V2b (calcaires de Lives et de Namèche) or S_2 with Lithostrotion martini and Prod. corrugatous-hemisphaericus. The sedimentation is rythmic with very nice sequences.

A2. Tramaka.

Two quarries form the parastratotype of the base of upper Visean, V3a, or "calcaire de Seilles" with Productus gigantoïdes and L. Martini (Base of D_1). In the upper part above the quarry, after a gap and below the Namurian (E_2b_2), one see four meters of E_2a_1 known only in this place in Belgium.

A3. Samson.

Quarries of the Samson's valley form the base of the V3b "Petit granit de Thon-Samson" with Productus giganteus and Caninia samsonensis or D_2.

A gap is localized between this lower part of V3b and the strata considered as the upper V3c here silty and dolomitised.

A4. Yvoir Road.

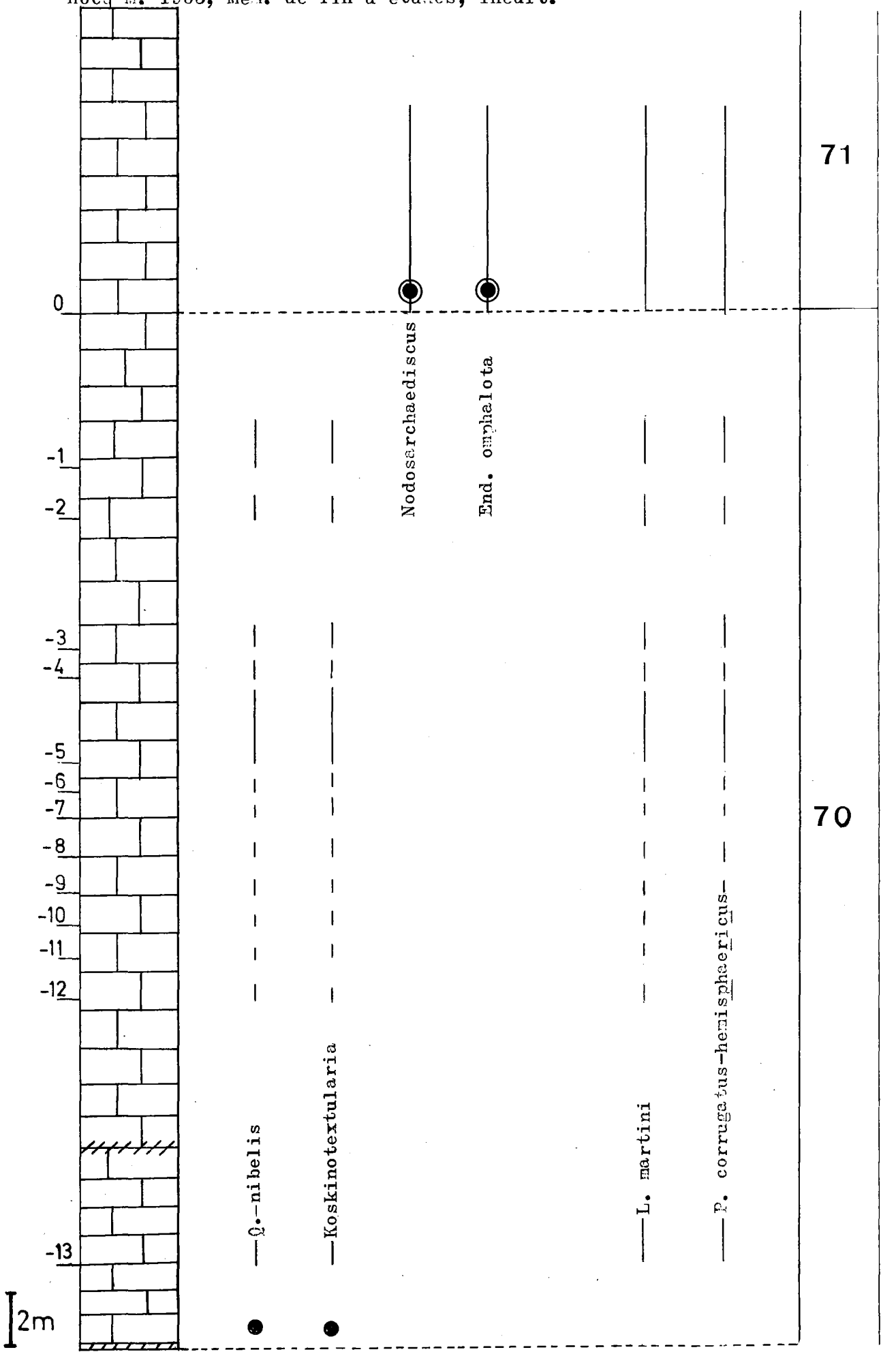
This outcrop exposes the upper Visean, V3b of the Dinant basin with rythmic sedimentation without the top of this level. A tonstein is localized near the base of this level.

A5. Warnant.

Along the old railway and in this quarry, it is possible to see the uppermost part of the upper Visean, V3b "calcaire de Bioul et de Warnant" with S. carteri. In the tunnel one can see the "calcaire Bleu-belge" with Goniatites cremistria schmidtianus, P. giganteus and P. latissimus. Tunnel's roof is formed by the base of V3c with Goniatites striatus, and a tonstein. On the hill one see the clayish upper V3c with many conodonts (Cavusgnatus) and Goniatites of CU III β and γ.

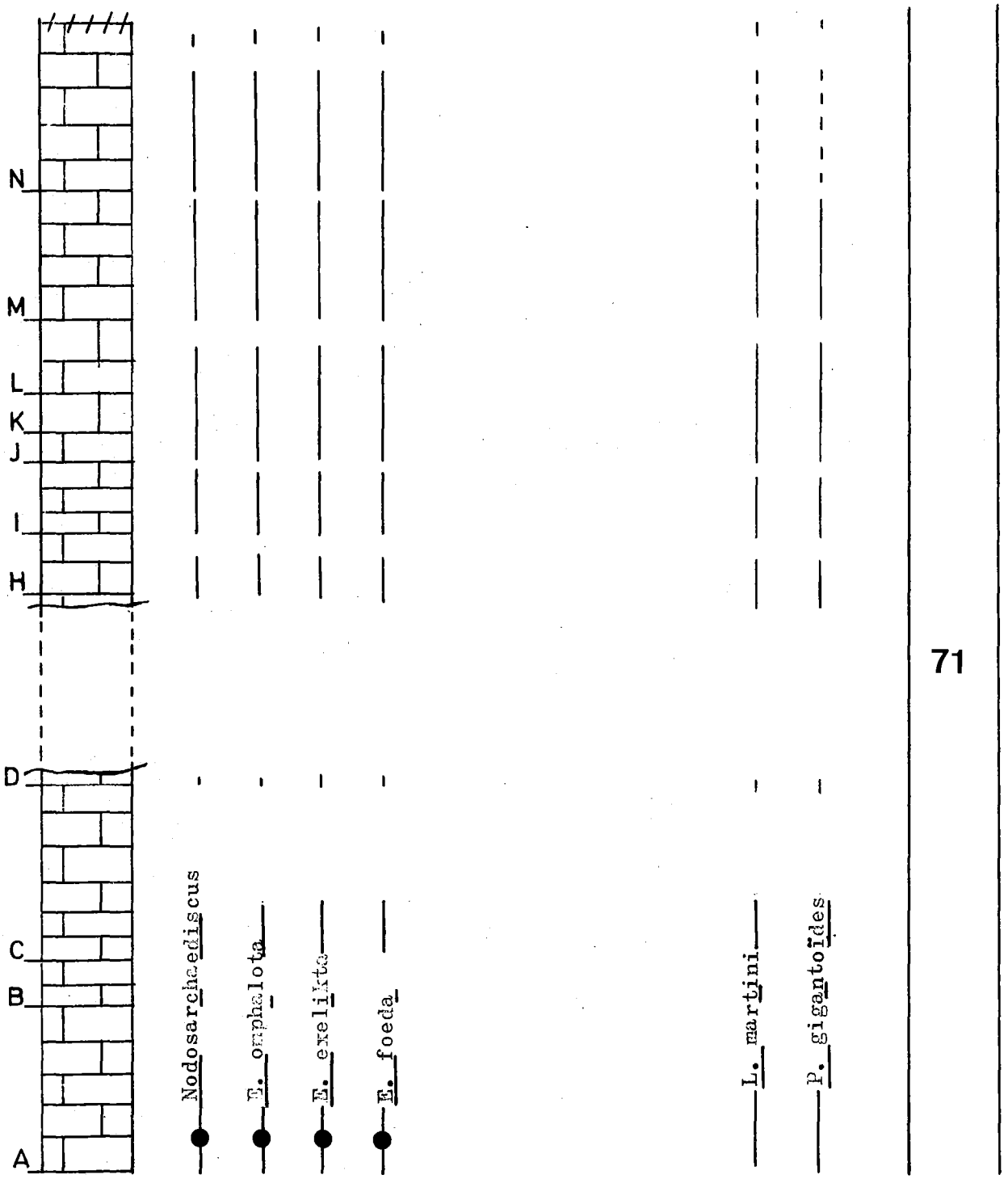
LIVES A ① a Mgm 70-71

Hocq M. 1965, Mém. de fin d'études, inédit.



TRAMAKA A②a Mgm 71

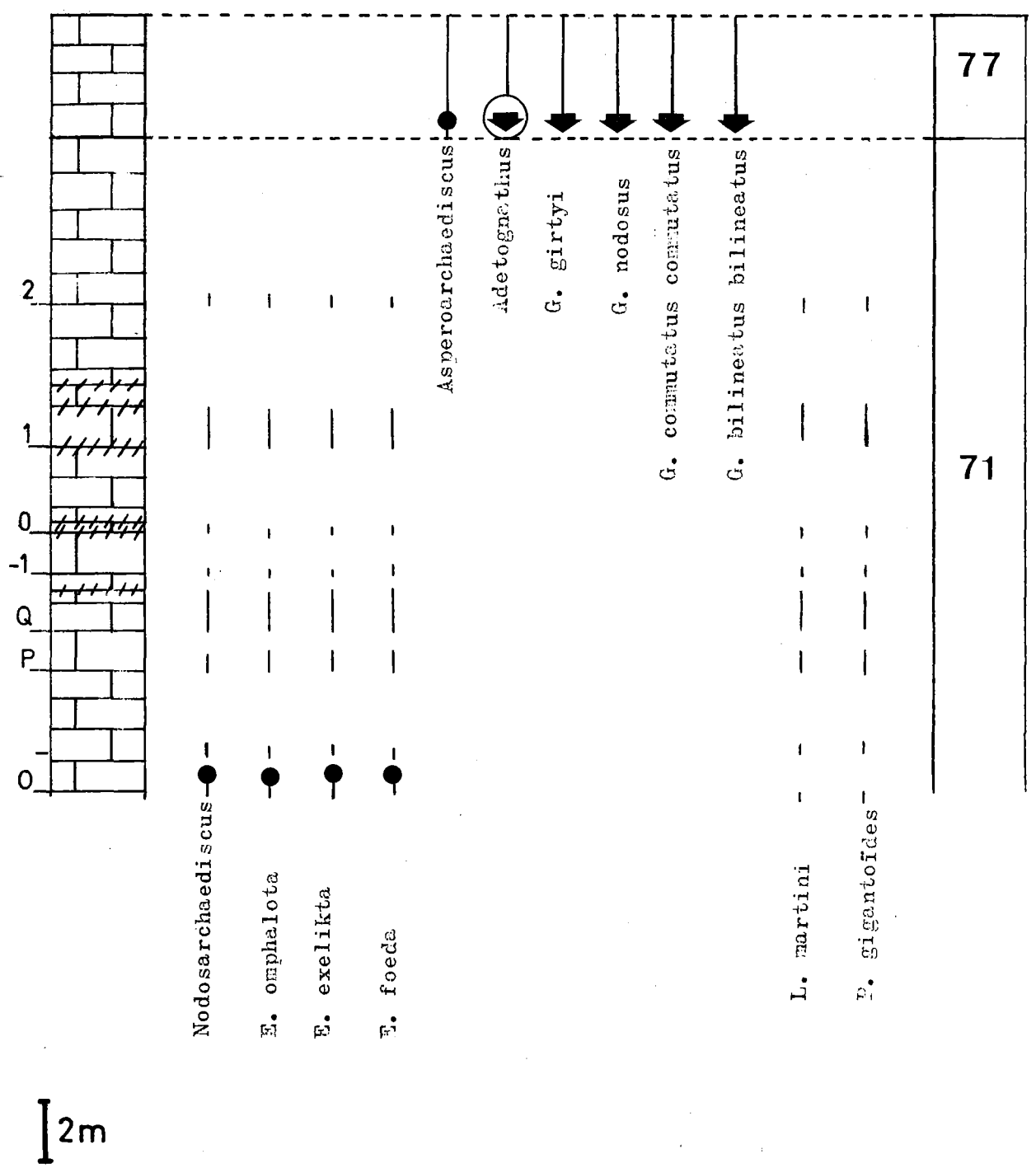
Pirlet H.- 1963, Ann.Soc. Géol. de Belgique, 86



2m

A, 2 = n° des séquences

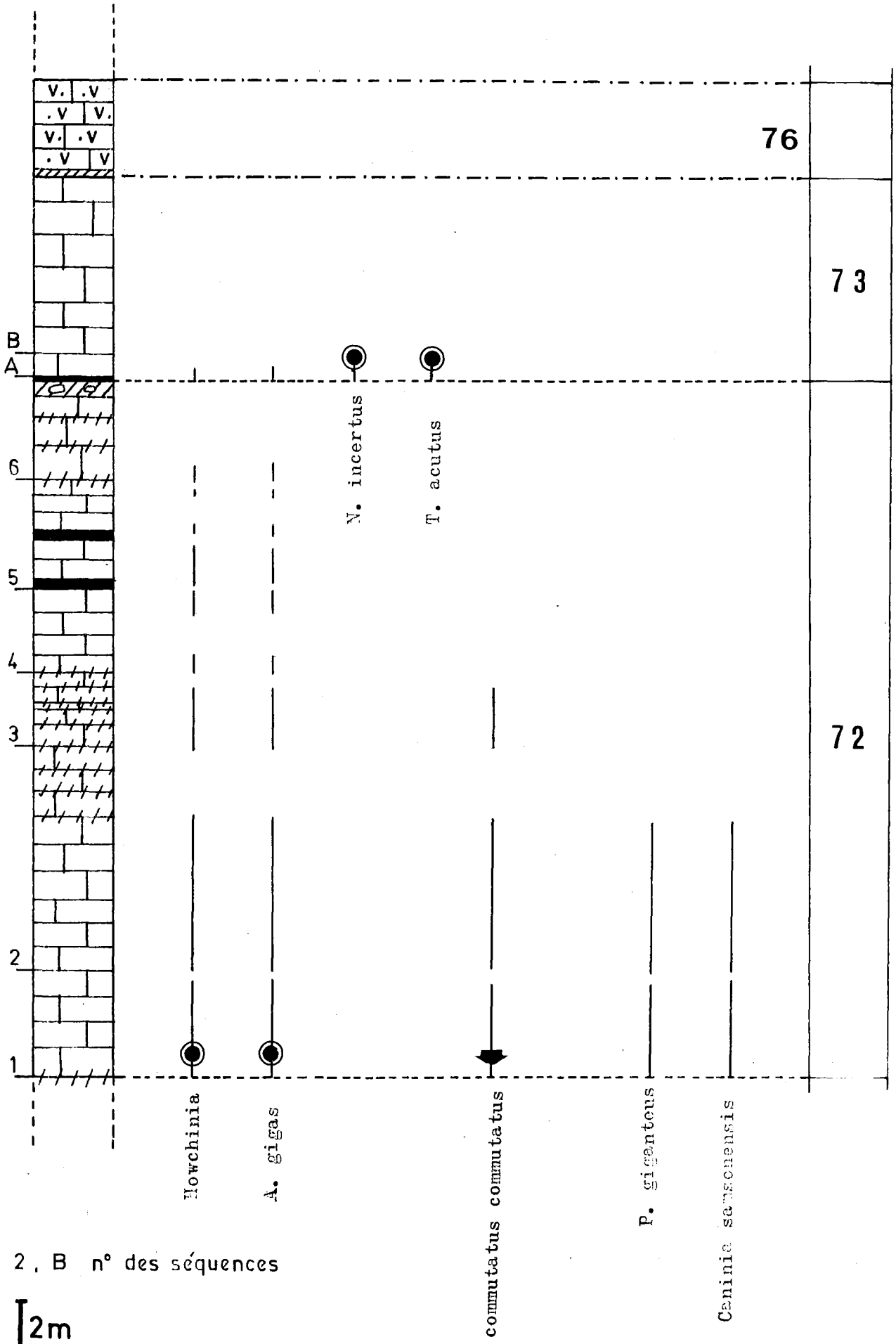
TRAMAKA A②b Mgm 71-77



A , 2 = n° des séquences

SAMSON A ③ Mgm 72-73

Pirlet H.-1968, Mem. Ac. Roy. de Belgique, XVII, in 4°, 2 ème série

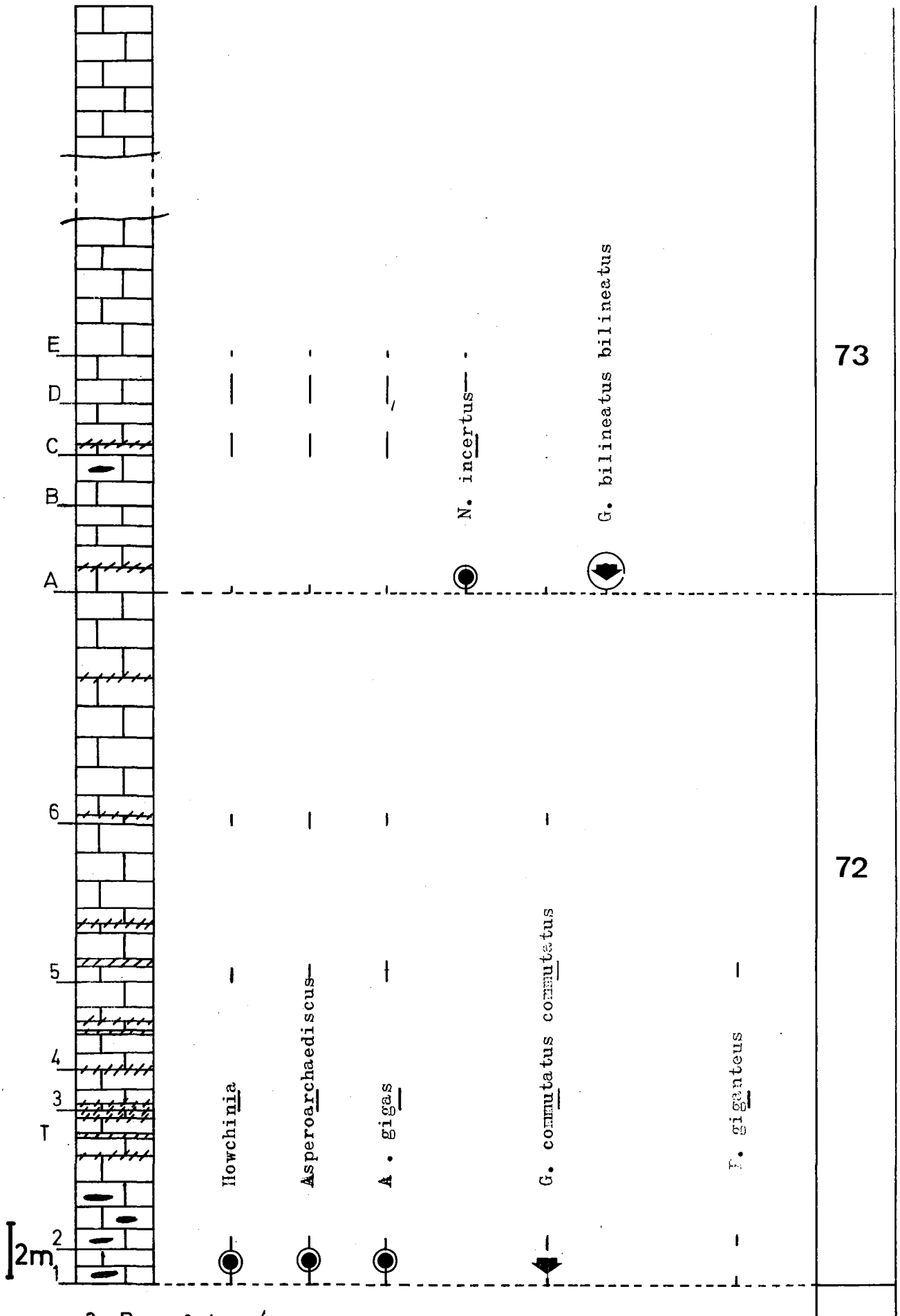


2 , B n° des séquences

2m

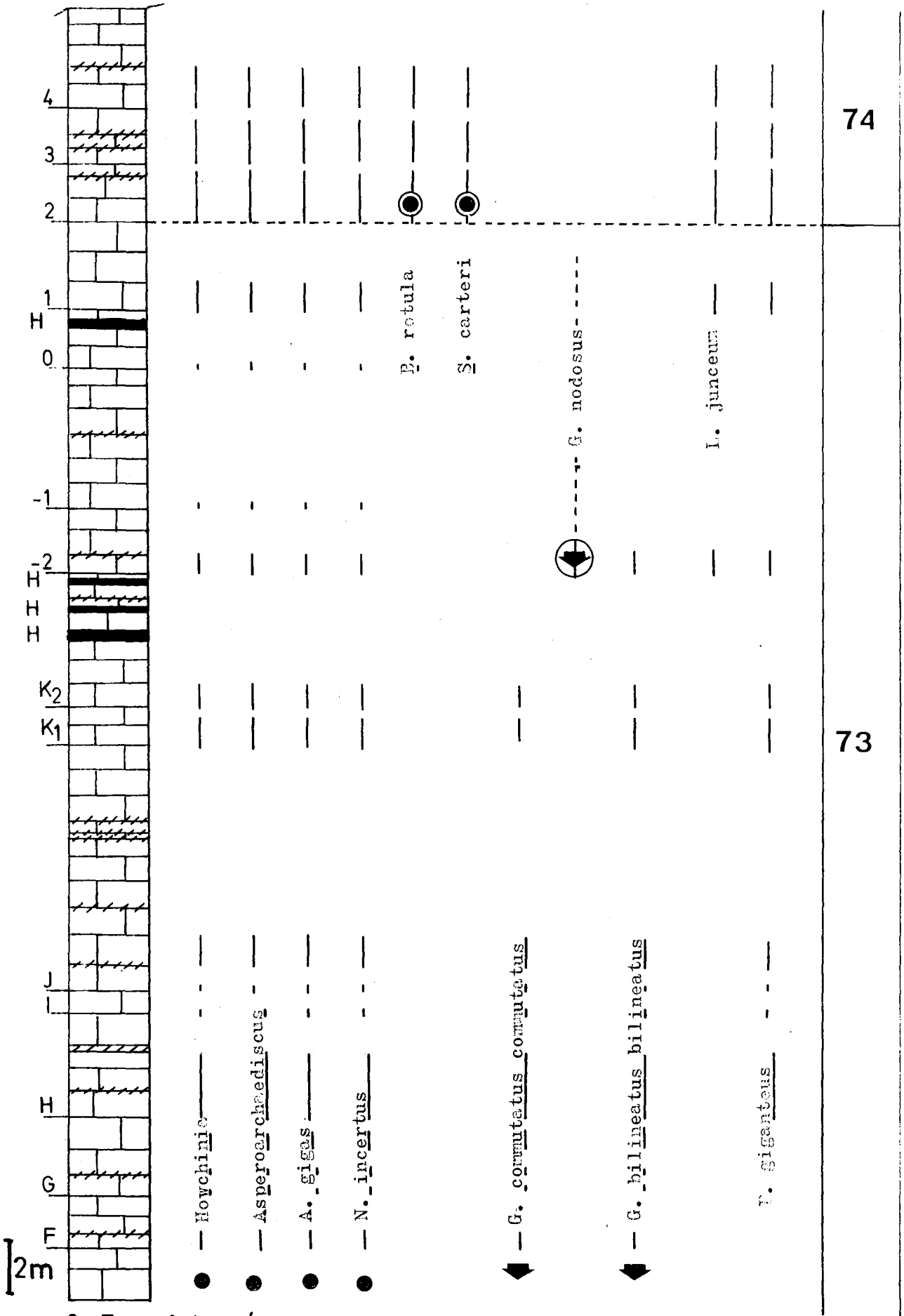
YVOIR (road) A④a Mgm 72-73

Pirlet H.- 1968, Mém. Ac. Roy. de Belgique, XVII, in 4°, 2ème série



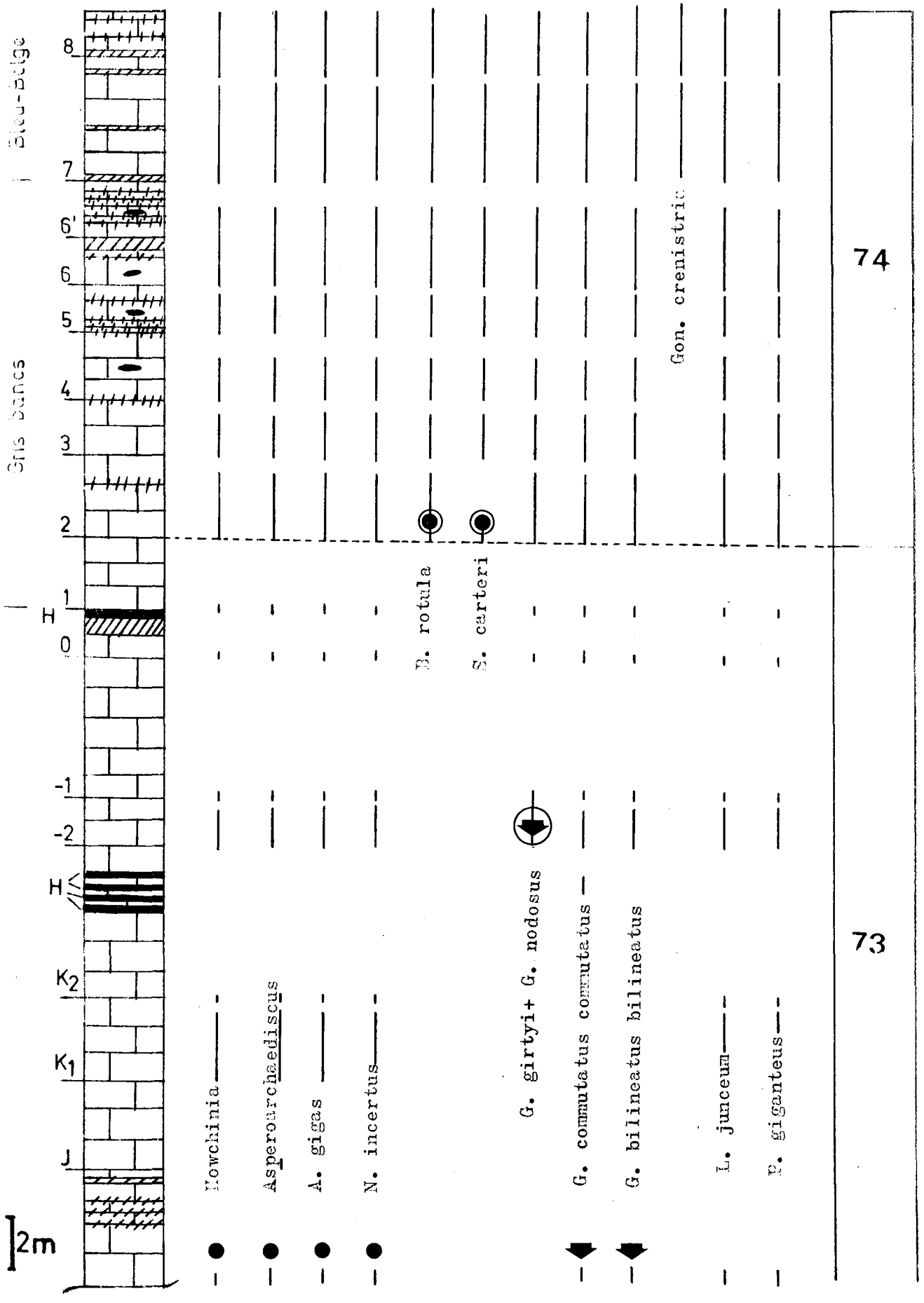
YVOIR A④b Mgm 73-74

(road)

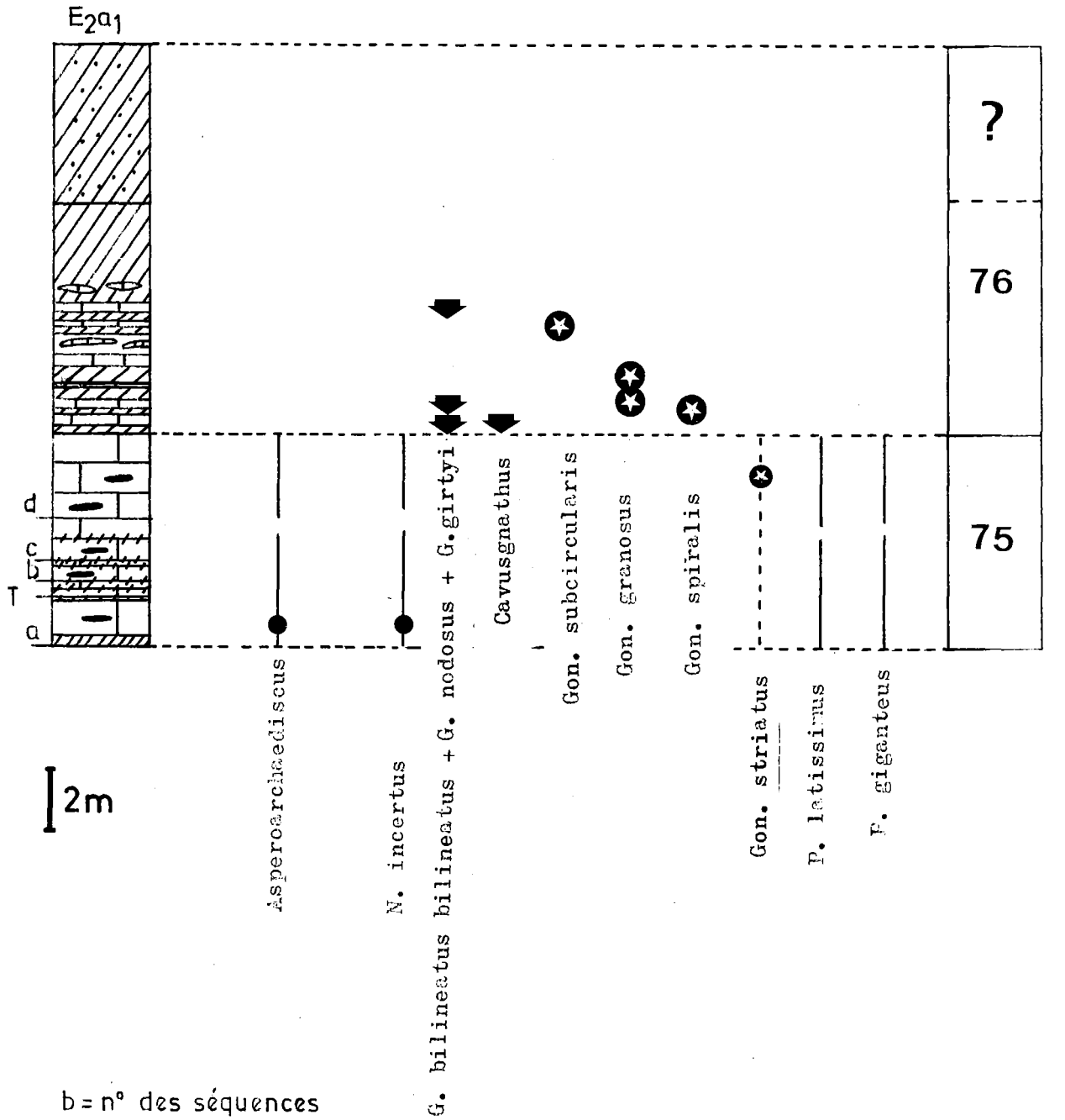


WARNANT A⑤a Mgm 73-74

Pirlet H.- 1968, Mém. Ac. Roy. de Belgique, XVII, in 4°, 2ème série.

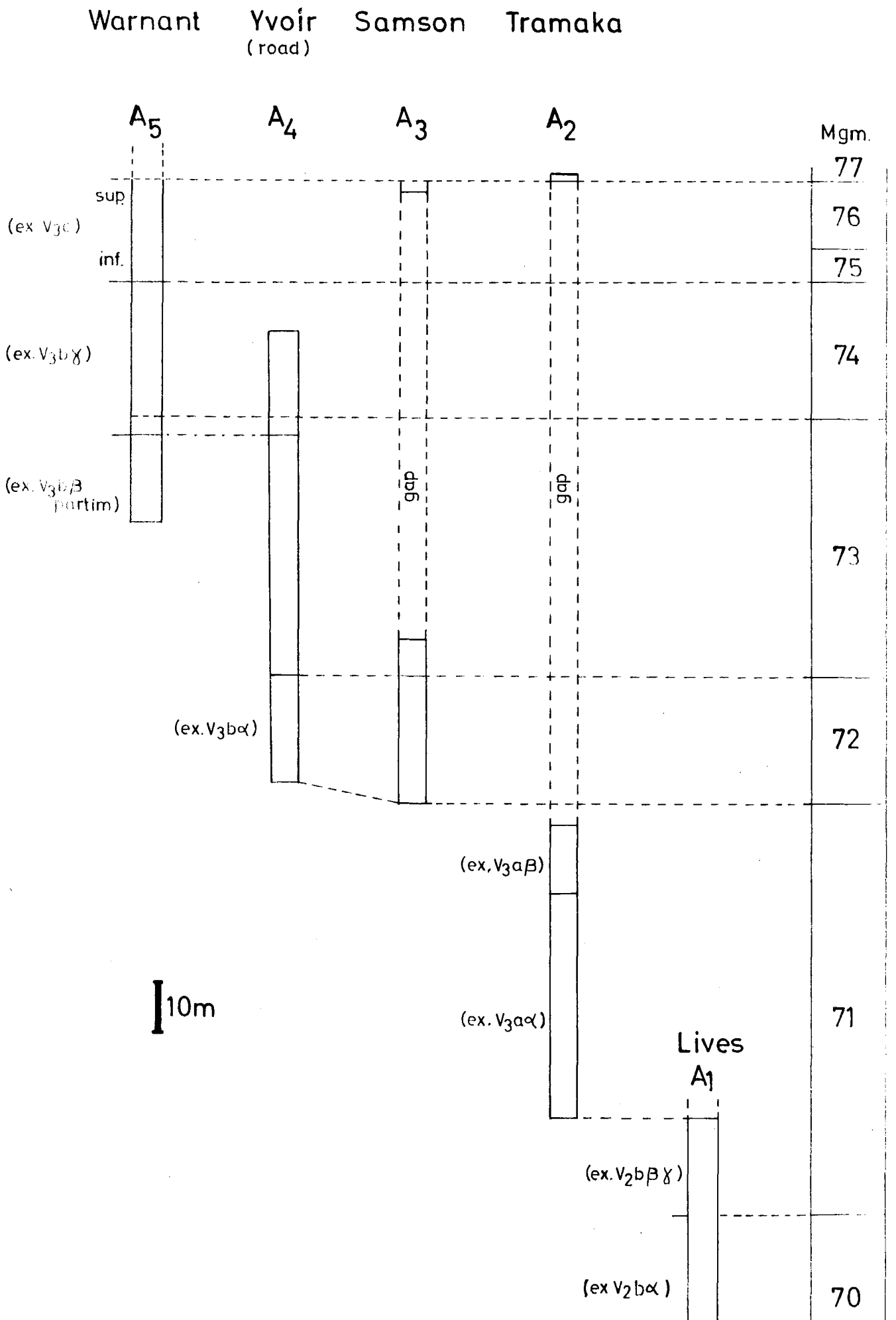


WARNANT A⑤b Mgm 75-76



b = n° des séquences

A. MIDDLE AND UPPER VISEAN



Littérature.

PIRLET, H. - 1963 - Sédimentologie des formations du Viséen supérieur, V3b, dans la vallée du Samson (Bassin de Namur, Belgique). Ann. Soc. Géol. de Belgique, t. 86, M. n° 1, pp. 1-45, 4 Pl., 4 figs., 2 hors-textes.

PIRLET, H. et CONIL, R. - 1963 - Sur quelques foraminifères caractéristiques du Viséen supérieur de la Belgique (Bassin de Namur et de Dinant). Bull. Soc. belge de Géol., t. 72, B. pp. 183-204, 1 tabl., 3 Pl.

PIRLET, H. - 1964 - La sédimentation rythmique du V3a inférieur du Bassin de Namur; les relations entre le Dinantien et le Namurien, de Namèche à Moha. Ann. Soc. Géol. de Belgique, t. 86, B. pp. 461-468, 1 fig., 1 hors-texte.

- 1966 - Présence d'un tonstein dans le Viséen supérieur des synclinoriums de Namur et de Dinant. Ann. Soc. Géol. de Belgique, t. 89, B. pp. 27-32, 1 microphot[illegible].

- 1968 - La sédimentation rythmique et la stratigraphie du Viséen supérieur V3b, V3c dans les synclinoriums de Namur et de Dinant (thèse doctorale). Mém. de l'Académie Royale de Belgique, Classe des Sciences, 2e série, t. XVII, fasc. 4, 4 figs., 5 tabl., 10 Pl. et 8 Pl. photographiques.

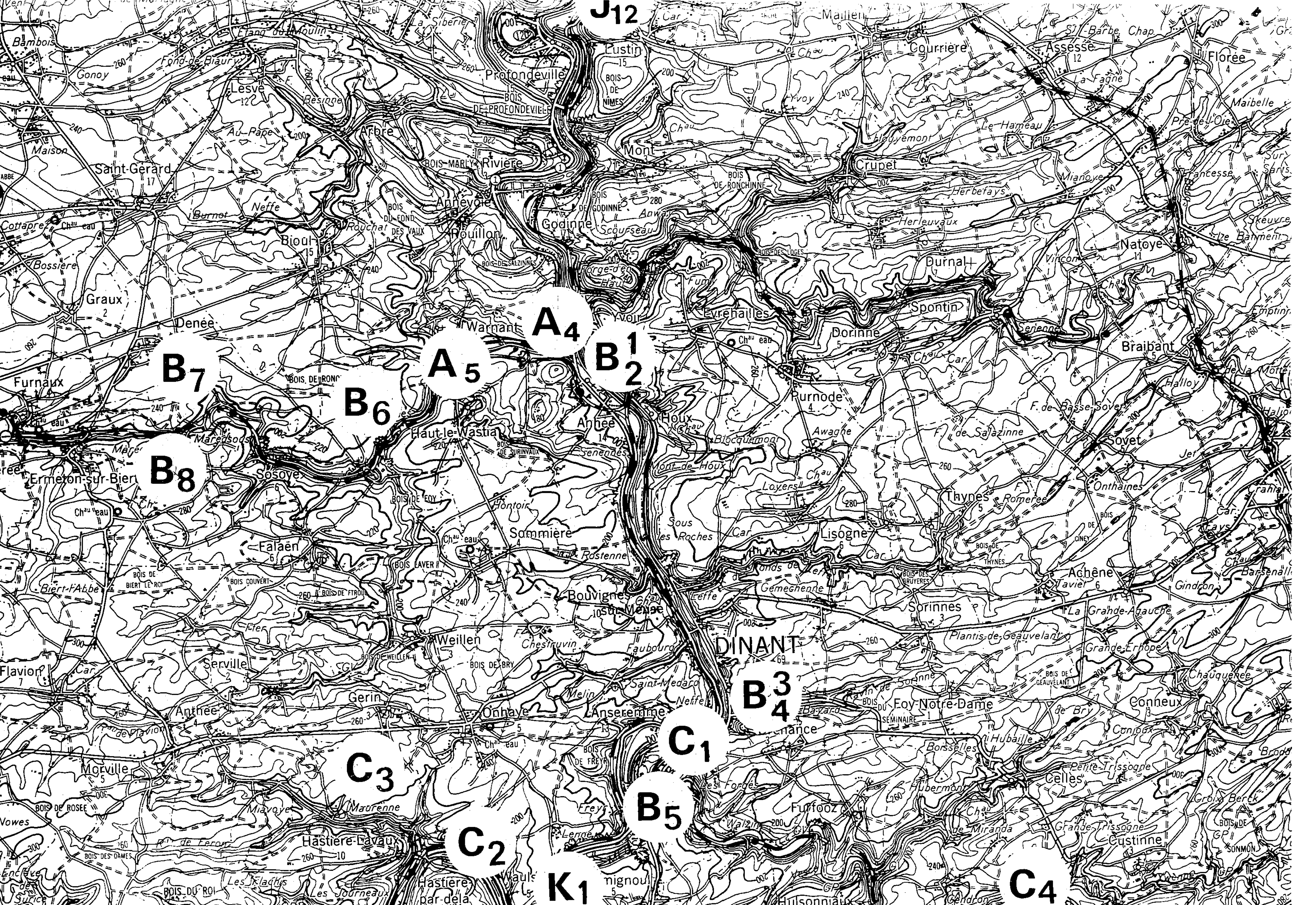
PIRLET, H. et CONIL, R. - 1970 - Le calcaire carbonifère du synclinorium de Dinant et le sommet du Famennien; Colloque sur la stratigraphie du Carbonifère. Les Congrès et Colloques de l'Université de Liège; V. 55, pp. 47-63, 3 figs., 2 hors-textes.

PIRLET, H., CONIL, R. et al. - 1971 - Aperçu géologique des formations du Carbonifère belge. Service Géologique de Belgique. Professional Paper n° 2.

PIRLET, H. et CONIL, R. - 1972 - L'évolution des Archaediscidae viséens. Bull. Soc. belge de Géologie, t. 80, pp. 101-124, 5 figs., 2 Pl., 1 tabl., 1 dépliant.

AUSTIN, R.L., GROESSENS, E., PIRLET, H. et CONIL, R. - 1973 - Etude biostratigraphique de l'encrinite de Tramaka. Soc. belge de Géologie (en publication).


A1
A2
A3
NAMUR
Saint-Germain
Upigny
Dhuy
Leuze
Cortil-Wodon
Forville
Noville-les-Bois
Bierwart
Waret-l'Evêque
Lonzée
Meux
Villers-lez-Heest
Warisoulx
Waret-la-Chaussée
Villiers
Pontillas
Héron
Lavoir
Beuzet
Saint-Denis
Bovesse
Daussoulx
Franc-Waret
Hingeon
Marchovelette
Cognelée
Gelbressée
Landenne
Seilles
Emines
Vedrin
Vezin
Rhisnes
Champion
Boninne
Saint-Marc
Arderne
Sclayn
Marche-les-Dames
Namêche
Suarlée
Saint-Servais
Bouge
Loyers
Bonneville
Coutisse
Belgrade
Flawinne
Floriffoux
Lives-sur-Meuse
Erpent
Maizeret
Thon
Haltinne
Jambes
Mozet
Malonne
Floreffe
Wierde
Naninne
Faulx-les-Tombes
Ohey
Wépion
Dave
Gesves
Sart Bernard


J12
A4
A5
B1 2
B3 4
B5
B6
B7
B8
C1
C2
C3
C4
K1
Lustin
Profondeville
Lesve
Arbre
Rivière
Annevoie
Godinne
Mont
Crupet
Courrière
Assesse
Florée
Natoye
Durnal
Spontin
Dorinne
Braibant
Evrehailles
Yvoir
Purnode
Houx
Anhée
Warnant
Haut-le-Wastia
Sosoye
Maredsous
Denée
Furnaux
Graux
Saint-Gérard
Bioul
Rouillon
Ermeton-sur-Biert
Falaën
Sommière
Bouvignes-sur-Meuse
DINANT
Leffe
Sorinnes
Achêne
Thynes
Lisogne
Weillen
Onhaye
Anseremme
Gerin
Serville
Anthée
Flavion
Morville
Hastière-Lavaux
Hastière-par-delà
Foy-Notre-Dame
Furfooz
Celles
Conneux
Custinne
Sovet
Awagne

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INTERNATIONAL SYMPOSIUM ON

NAMUR 1974

BELGIAN MICROPALEONTOLOGICAL LIMITS

FROM EMSIAN TO VISEAN – SEPTEMBER 1st to 10th

EXCURSION B

Guides :

CONIL R.

GROESSENS E. (leader)

GUIDEBOOK

Edited by

J. BOUCKAERT & M. STREEL

YVOIR gare [1] B①a (M.g.m.49-56)

1960. R.CONIL, Bull.Soc.belge Géol., LXIX, pp.277-294.

1964. R.CONIL, M.LYS & E.PAPROTH, Acad.roy.Belg.,Cl.Sc.,Mém.4°, 2, XV, 4, pp.41-42, pl.I.

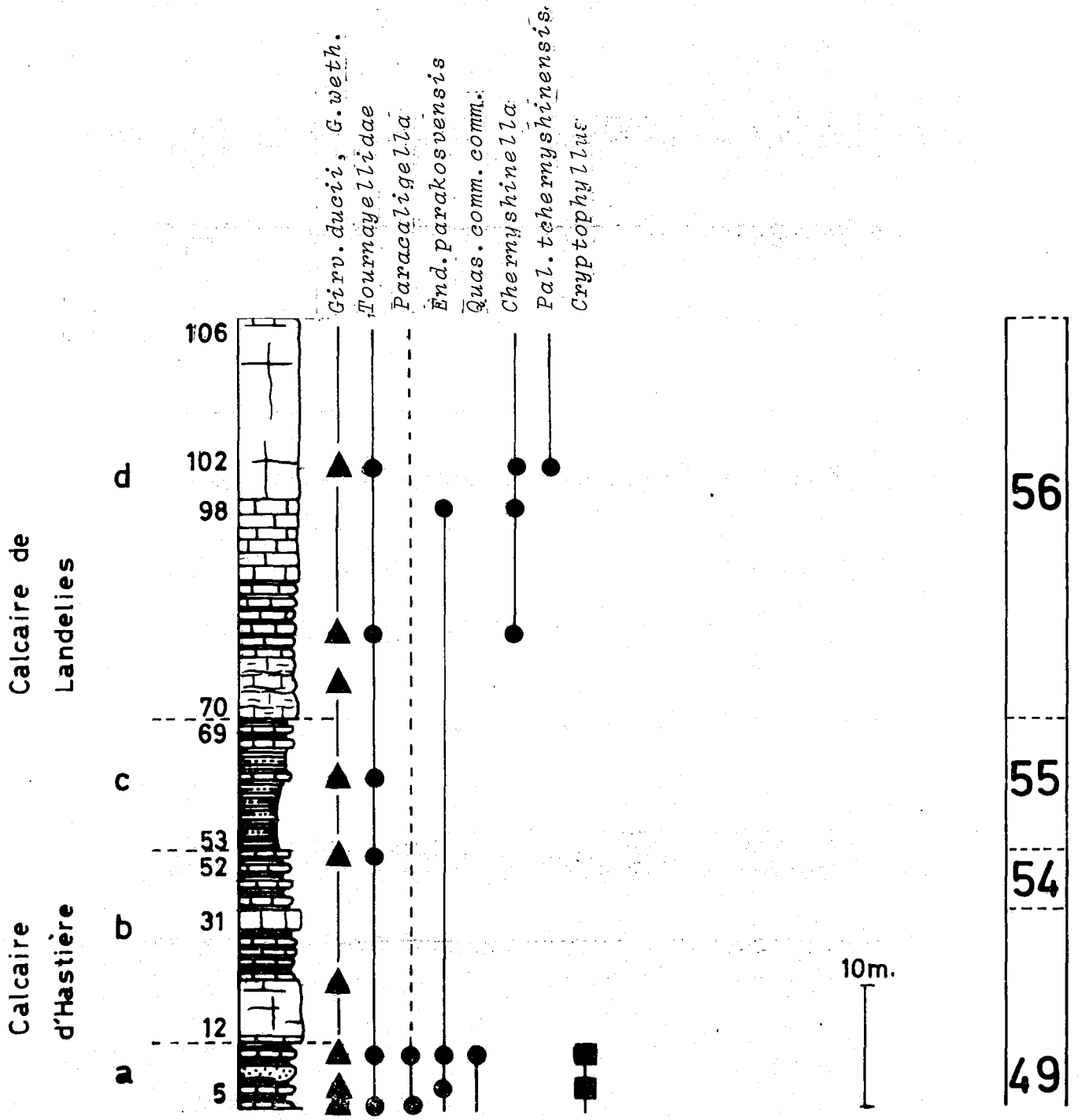
1968. R.CONIL, Ann.Soc.géol.Belg.,90, pp.714-717, h.t.III, figs 6,10.

1970. R.AUSTIN, R.CONIL, G.DOLBY, M.LYS, E.PAPROTH, F.RHODES, M.STREEL, J.UTTING, D.WEYER, Congr.Coll.Univ.Liège, 55, Strat.Carbon., pp.167-178.

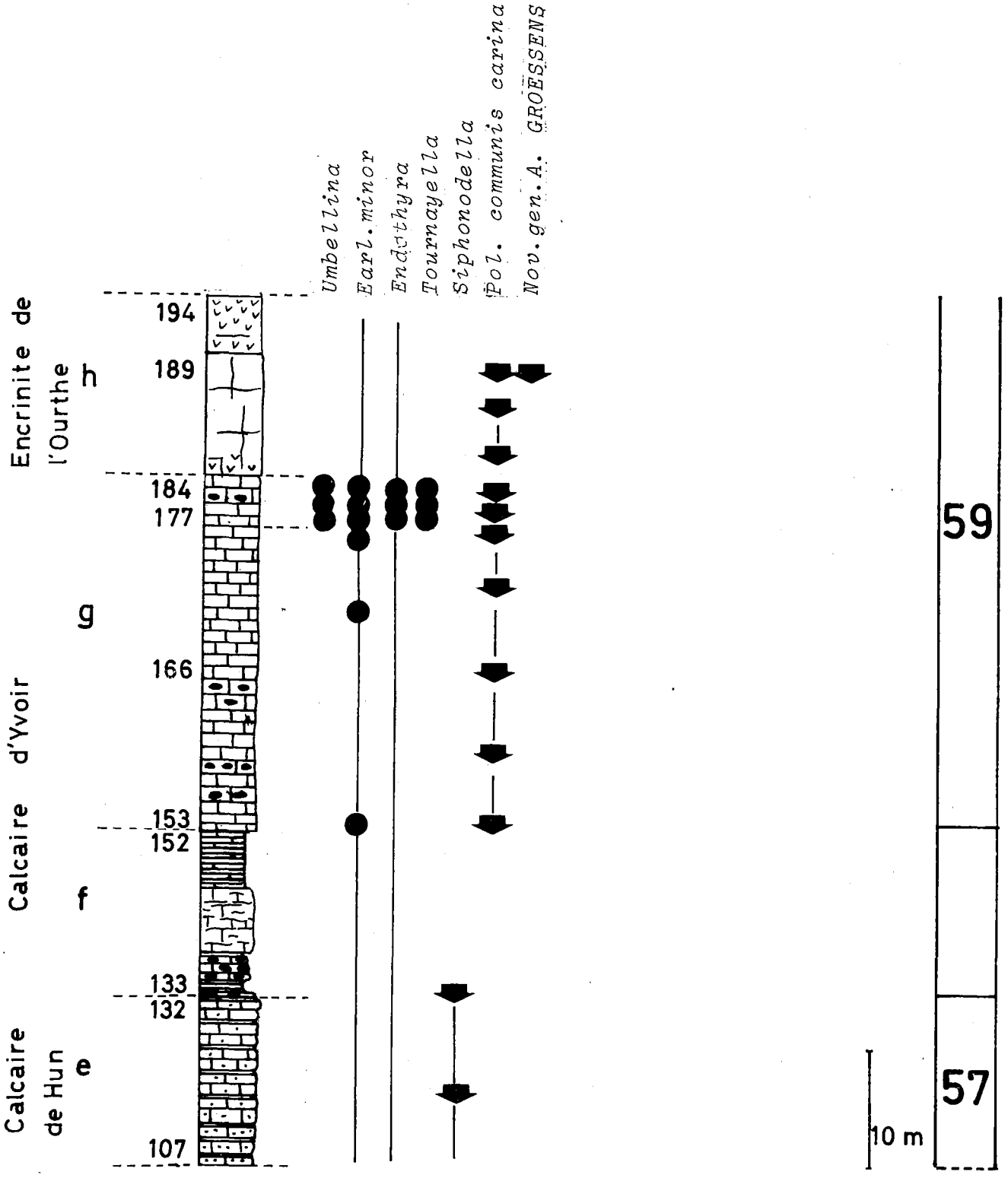
1971. J.BOUCKAERT, R.CONIL, A.DELMER, E.GROESSENS, G.MORTELMANS, H.PIRLET, M.STREEL, J.THOREZ, Prof.Paper, Serv.géol.Belg., n°2, pp.12,18.

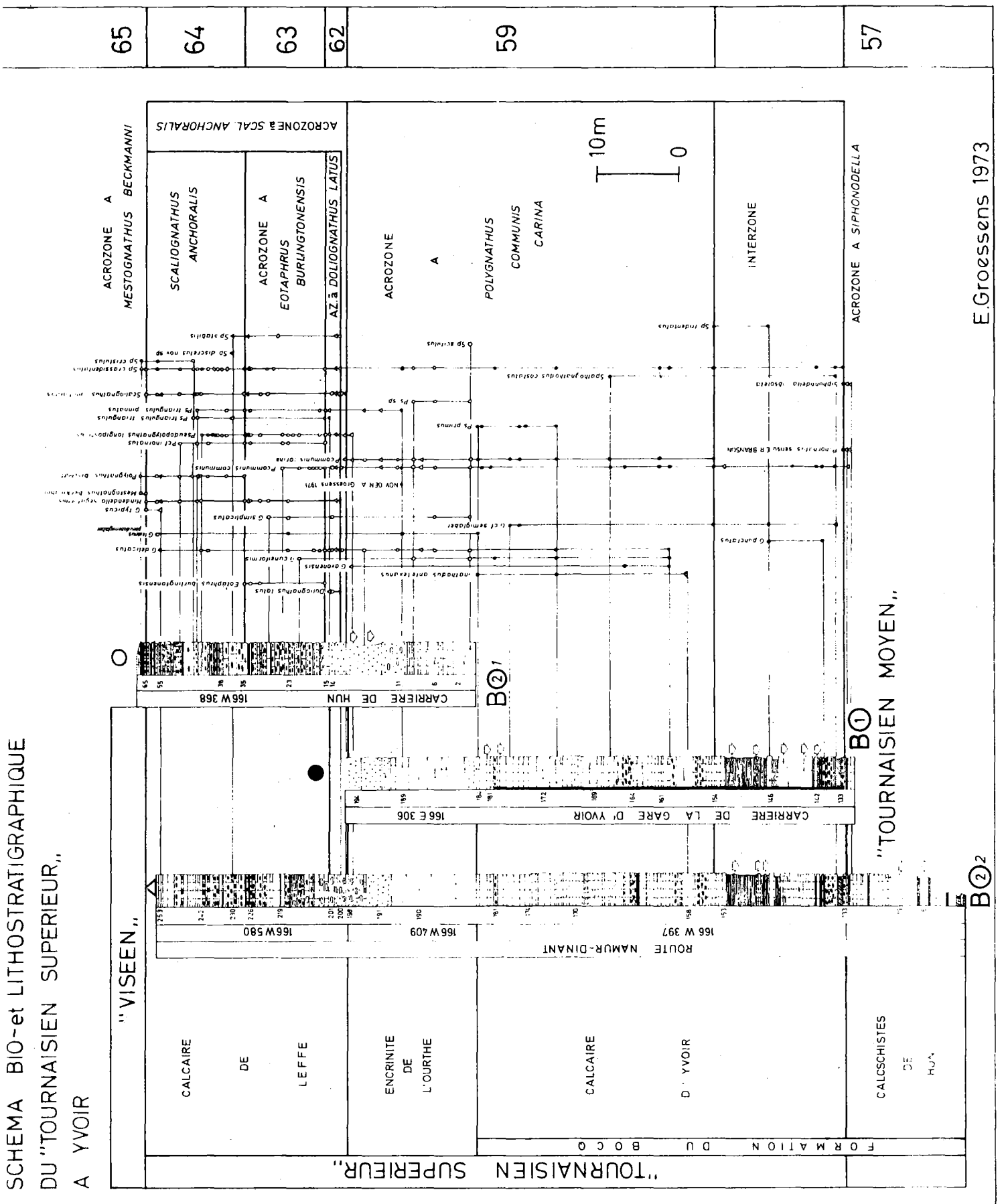
1972. R.CONIL & G.VANDEVEN, Prof.Paper, Serv.géol.Belg.,n°1, fig.9.

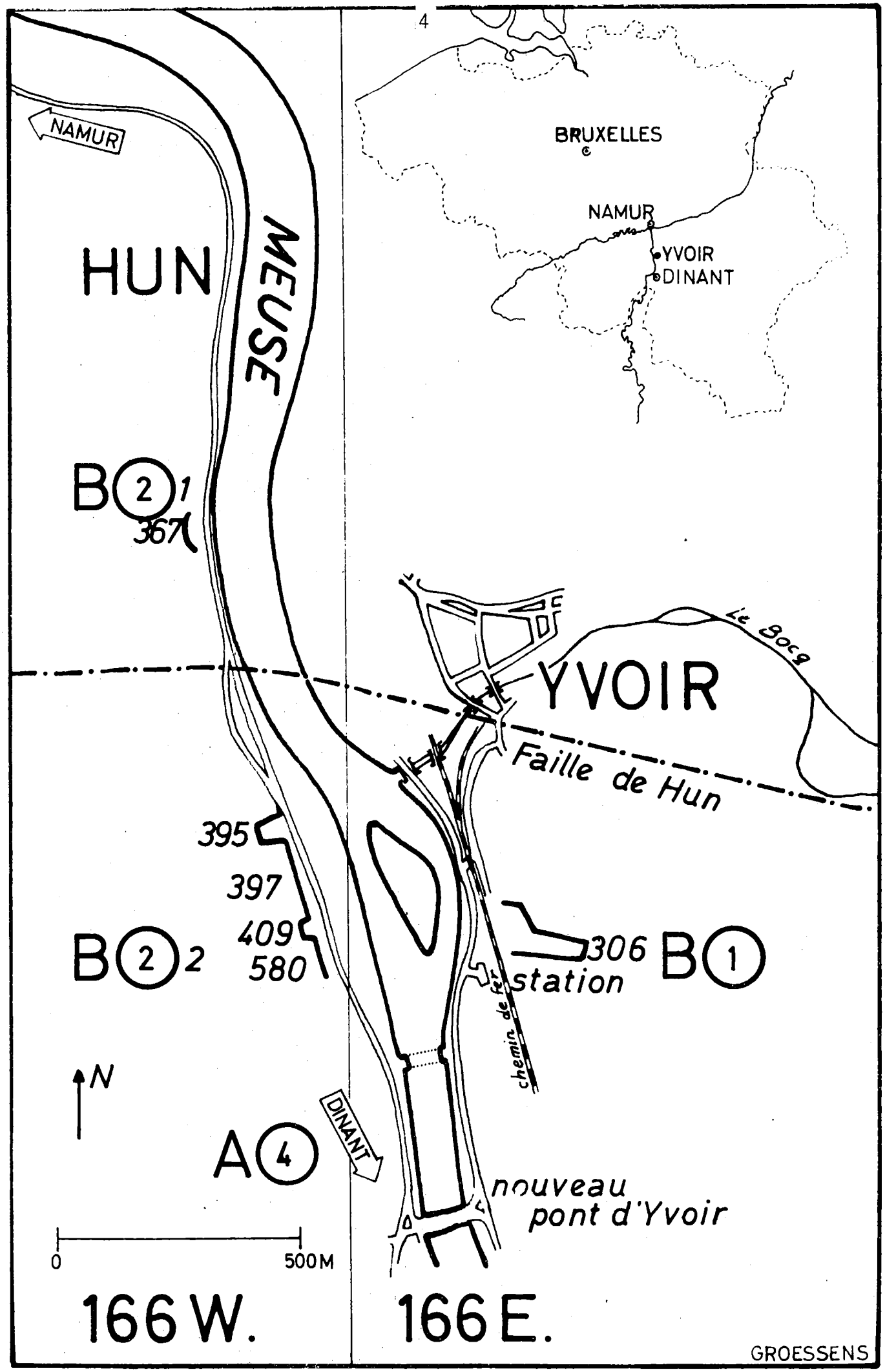
1973. E.GROESSENS & R.CONIL, Prof.Paper, Serv.géol.Belg.,n°5.

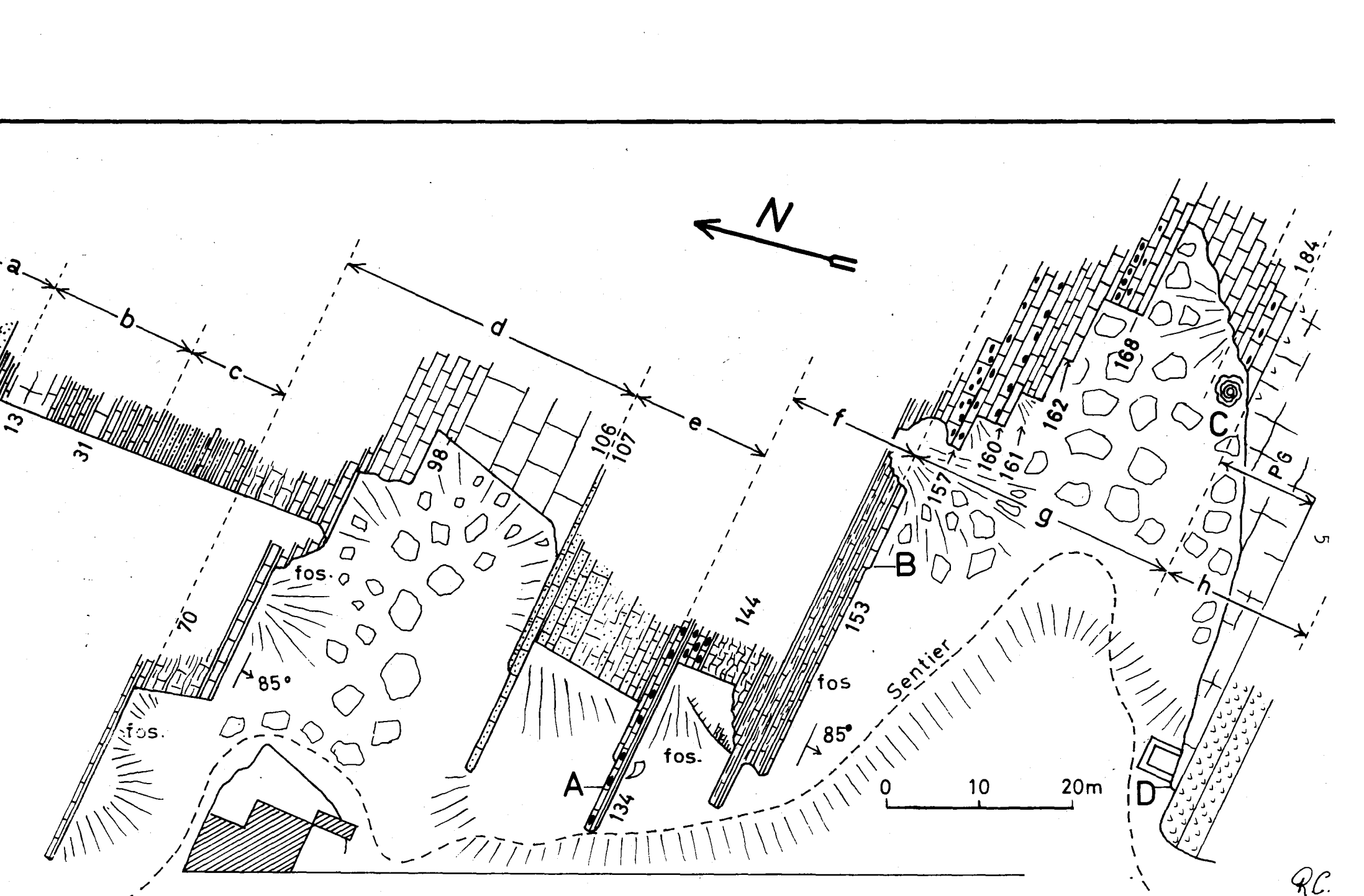


B①b (M.g.m.57-59)


Umbellina
Earl. minor
Endothyra
Tournayella
Siphonodella
Pol. communis carina
Nov. gen. A. GROESSENS
Encrinite de l'Ourthe
Calcaire d'Yvoir
Calcaire de Hun
h
g
f
e
194
189
184
177
166
153
152
133
132
107
59
57
10 m

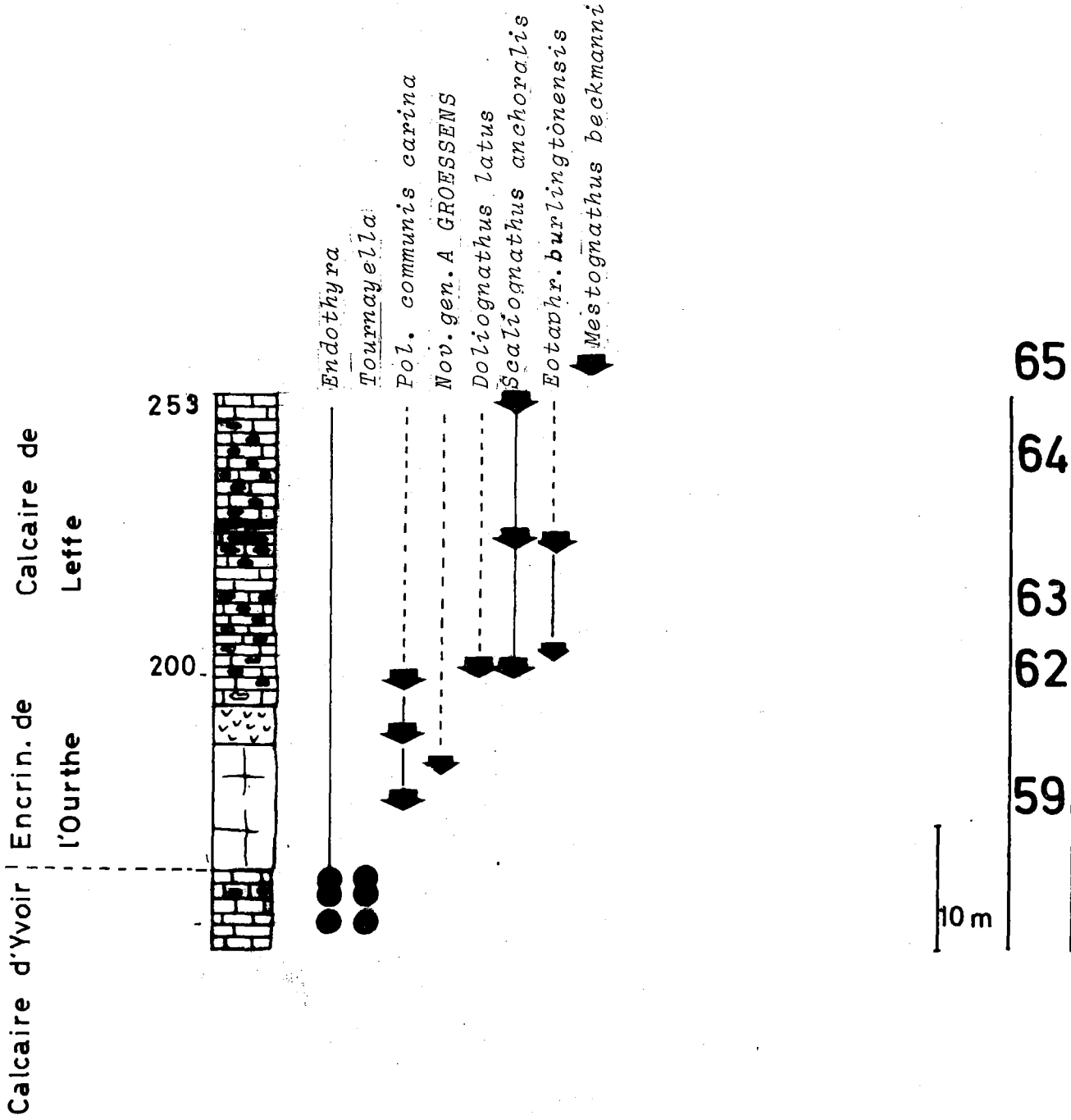

SCHEMA BIO-et LITHOSTRATIGRAPHIQUE
DU "TOURNAISIEN SUPERIEUR,,
A YVOIR
E.Groessens 1973
"TOURNAISIEN SUPERIEUR,,
FORMATION DU BOCQ
CALCSCHISTES DE HUN
CALCAIRE D'YVOIR
ENCRINITE DE L'OURTHE
CALCAIRE DE LEFFE
"VISEEN,,
ROUTE NAMUR-DINANT
166 W 397
166 W 409
166 W 580
CARRIERE DE LA GARE D'YVOIR
166 E 306
CARRIERE DE HUN
166 W 368
"TOURNAISIEN MOYEN,,
INTERZONE
ACROZONE A POLYGNATHUS COMMUNIS CARINA
ACROZONE A DOLIOGNATHUS LATUS
ACROZONE A EOTAPHRUS BURLINGTONENSIS
ACROZONE A SCALIOGNATHUS ANCHORALIS
ACROZONE A MESTOGNATHUS BECKMANNI
ACROZONE A SIPHONODELLA
10m
0
B①
B②1
B②2

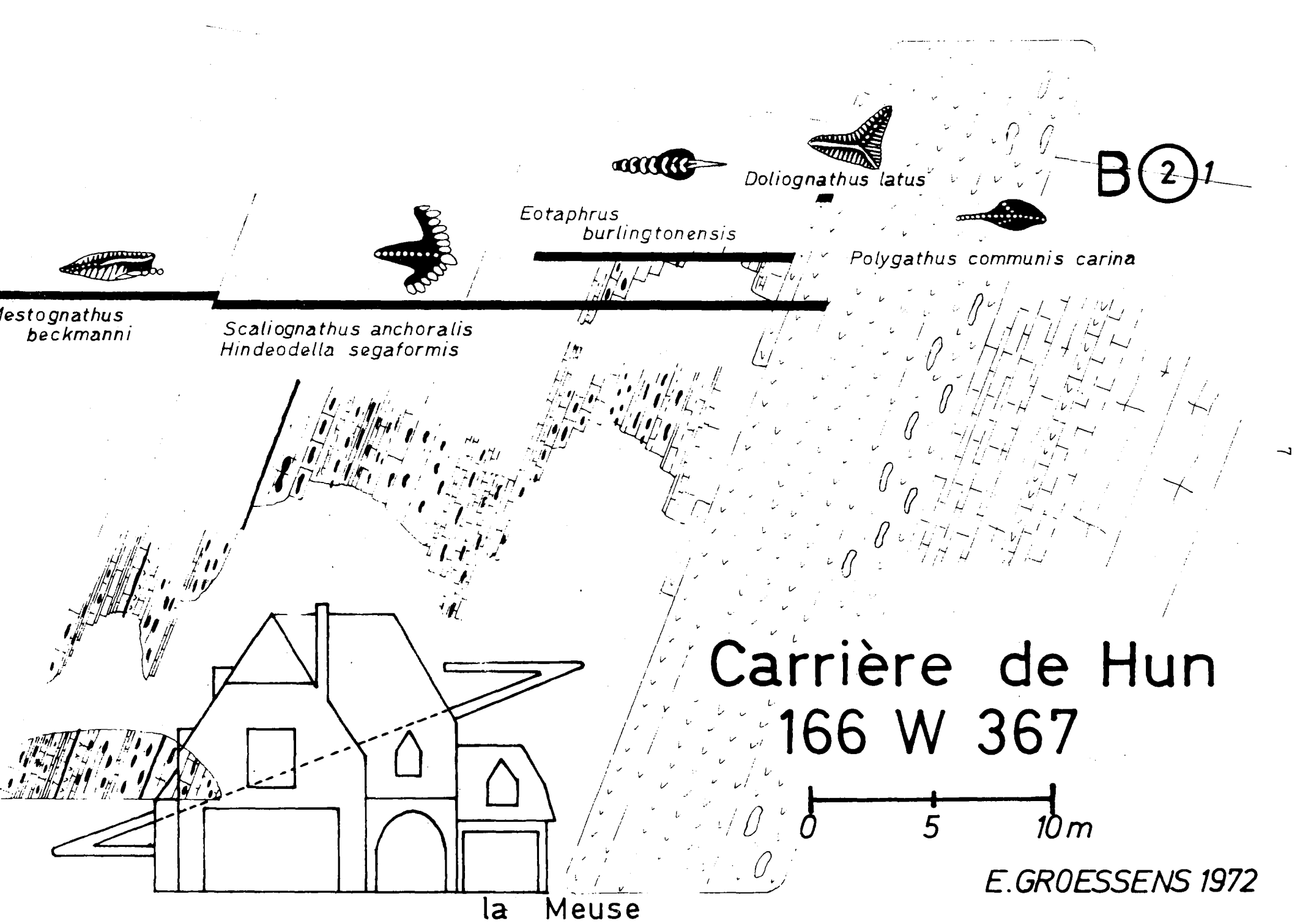

NAMUR
HUN
MEUSE
BRUXELLES
NAMUR
YVOIR
DINANT
B (2) 1
367
YVOIR
Le Bocq
Faille de Hun
395
397
409
580
B (2) 2
306
station
B (1)
chemin de fer
N
DINANT
A (4)
nouveau
pont d'Yvoir
0
500M
166 W.
166 E.
GROESSENS

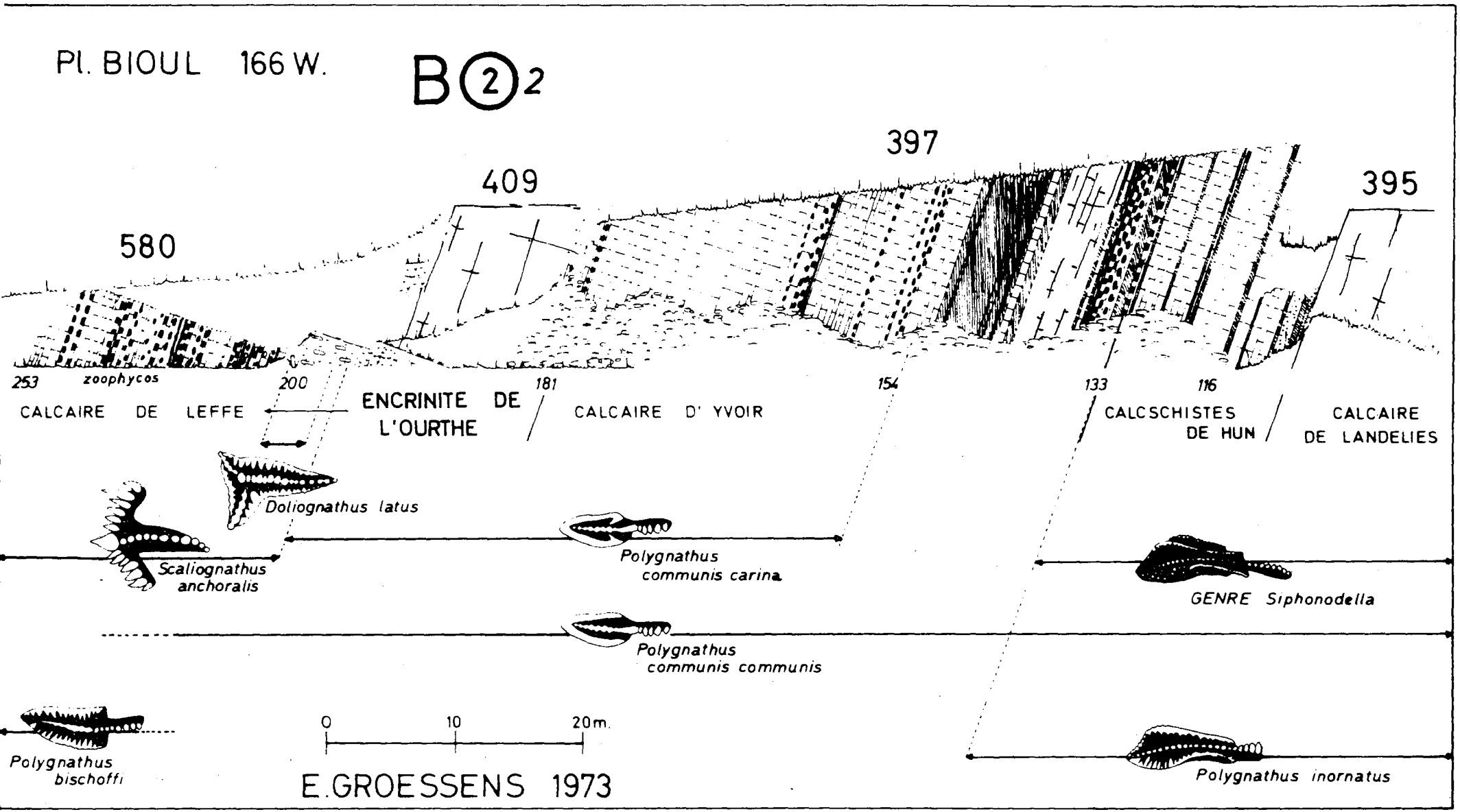

N
a
b
c
d
e
f
g
h
13
31
70
98
106
107
144
153
134
157
160
161
162
168
184
P6
fos.
fos.
fos.
fos
85°
85°
Sentier
A
B
C
D
0
10
20m
RC.

YVOIR route B② (M.g.m.59-64)

1973. E.GROESSENS & R.CONIL, Prof.Paper, Serv.géol.Belg.,n°5.




B 2 1
Doliognathus latus
Eotaphrus
burlingtonensis
Polygathus communis carina
lestognathus
beckmanni
Scaliognathus anchoralis
Hindeodella segaformis
Carrière de Hun
166 W 367
0
5
10 m
E. GROESSENS 1972
la Meuse


Pl. BIOUL 166 W.
B (2) 2
580
409
397
395
253
zoophycos
200
181
154
133
116
CALCAIRE DE LEFFE
ENCRINITE DE L'OURTHE
CALCAIRE D' YVOIR
CALCSCHISTES DE HUN
CALCAIRE DE LANDELIES
Doliognathus latus
Scaliognathus anchoralis
Polygnathus communis carina
GENRE Siphonodella
Polygnathus communis communis
Polygnathus bischoffi
Polygnathus inornatus
0
10
20m.
E.GROESSENS 1973

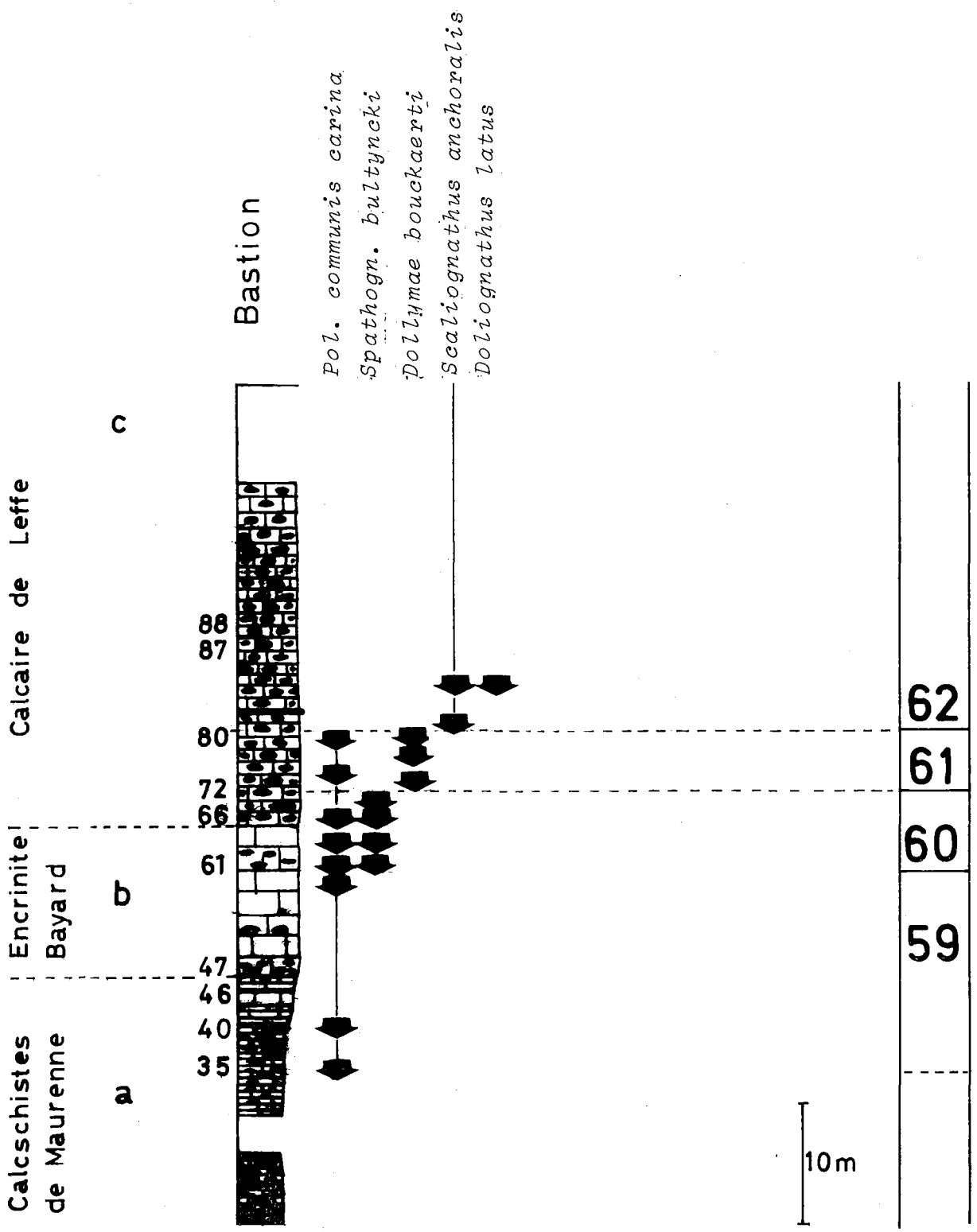
DINANT B③a (M.g.m. 59-62)

1964. B.MAMET, Inst.roy.Sc.nat.Belg., Mém.151, carr.Lambert 65.

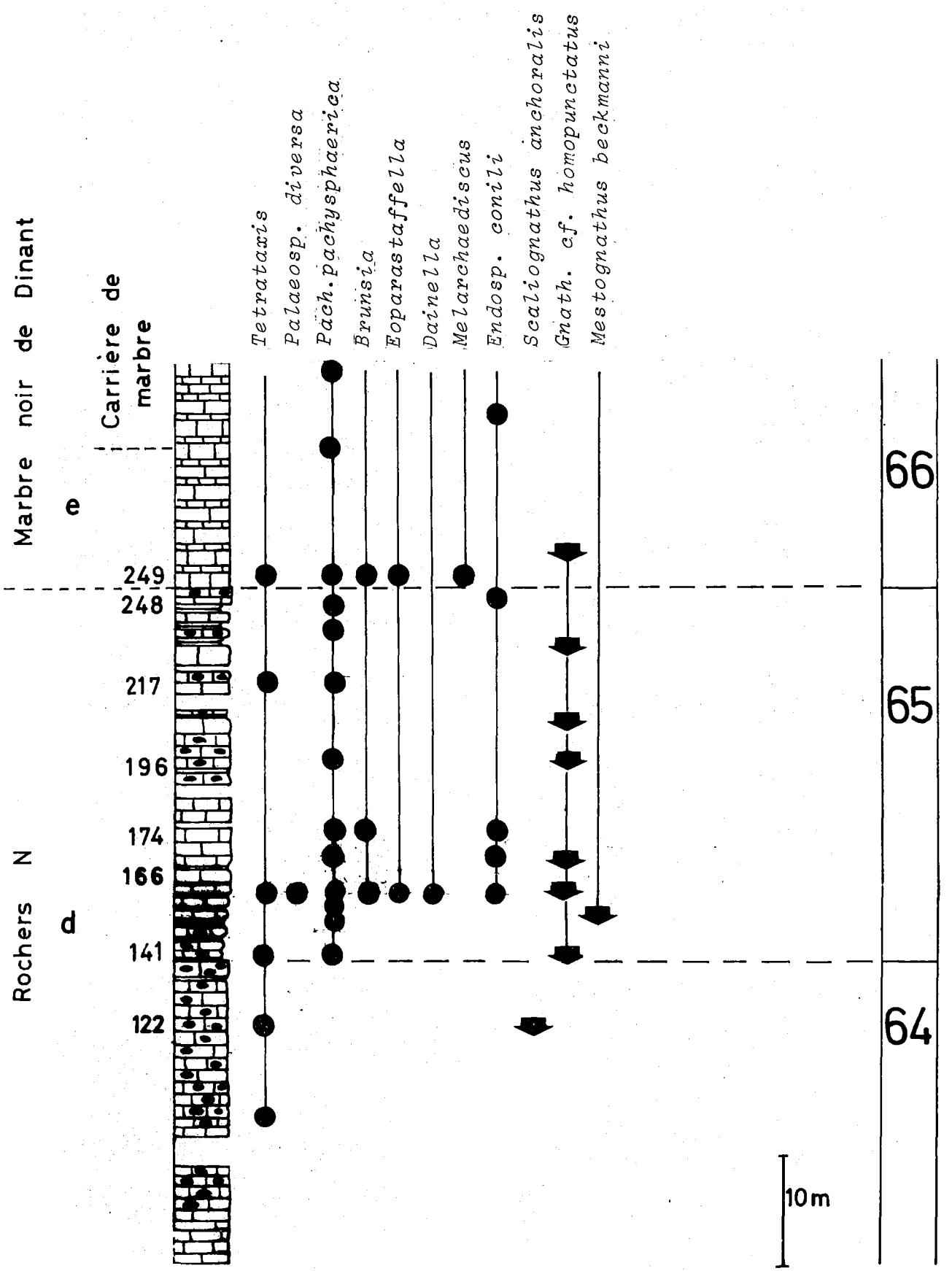
1965. B.MAMET, Ann.Soc.géol.Belg., 88, pp.187-219.

1968. R.CONIL, Ann.Soc.géol.Belg., 90, pp.695-696.

1969. R.CONIL, R.AUSTIN, M.LYS & F.RHODES, Bull.Soc.belge Géol. LXXVII, pp.39-69.

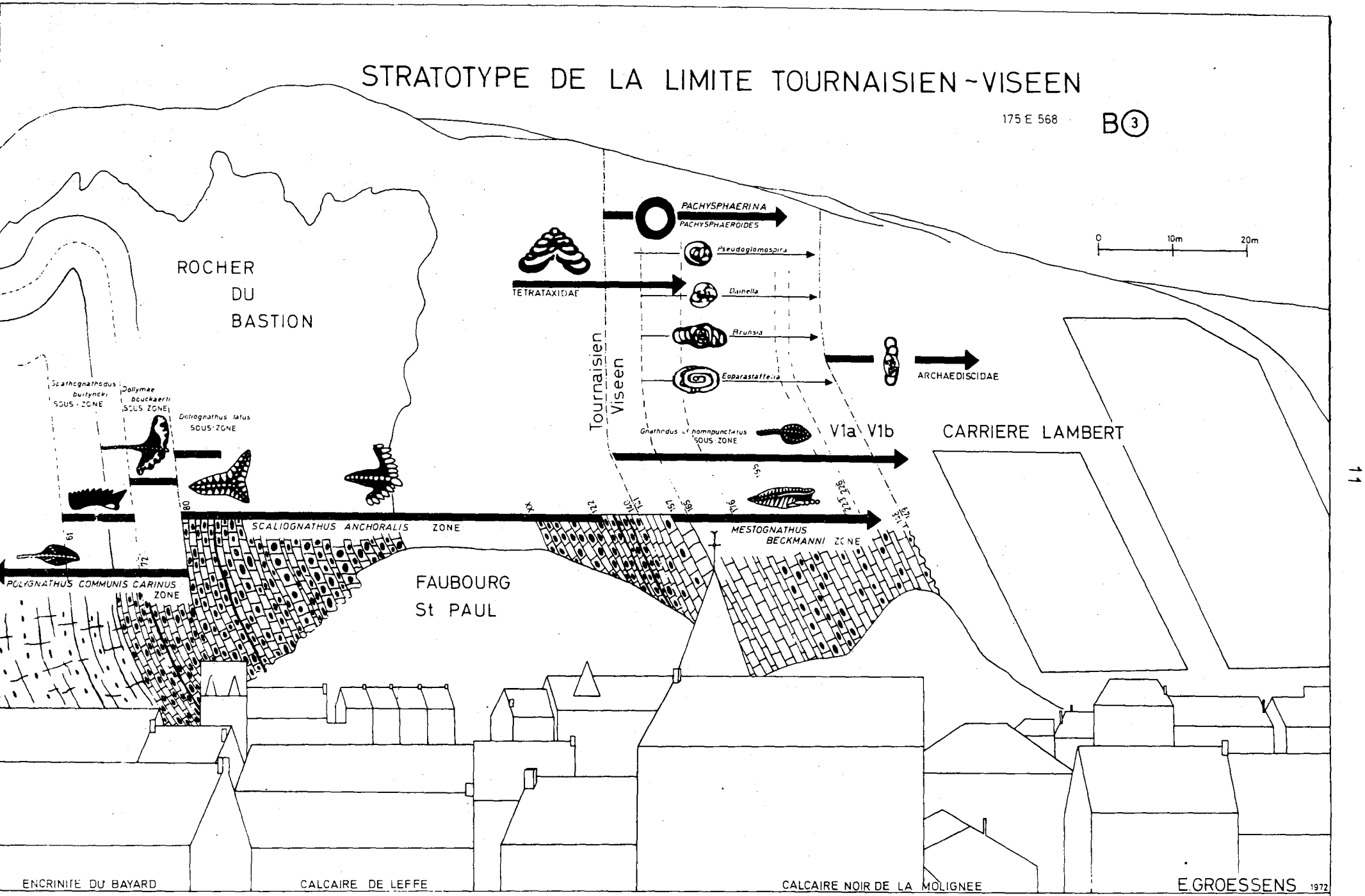


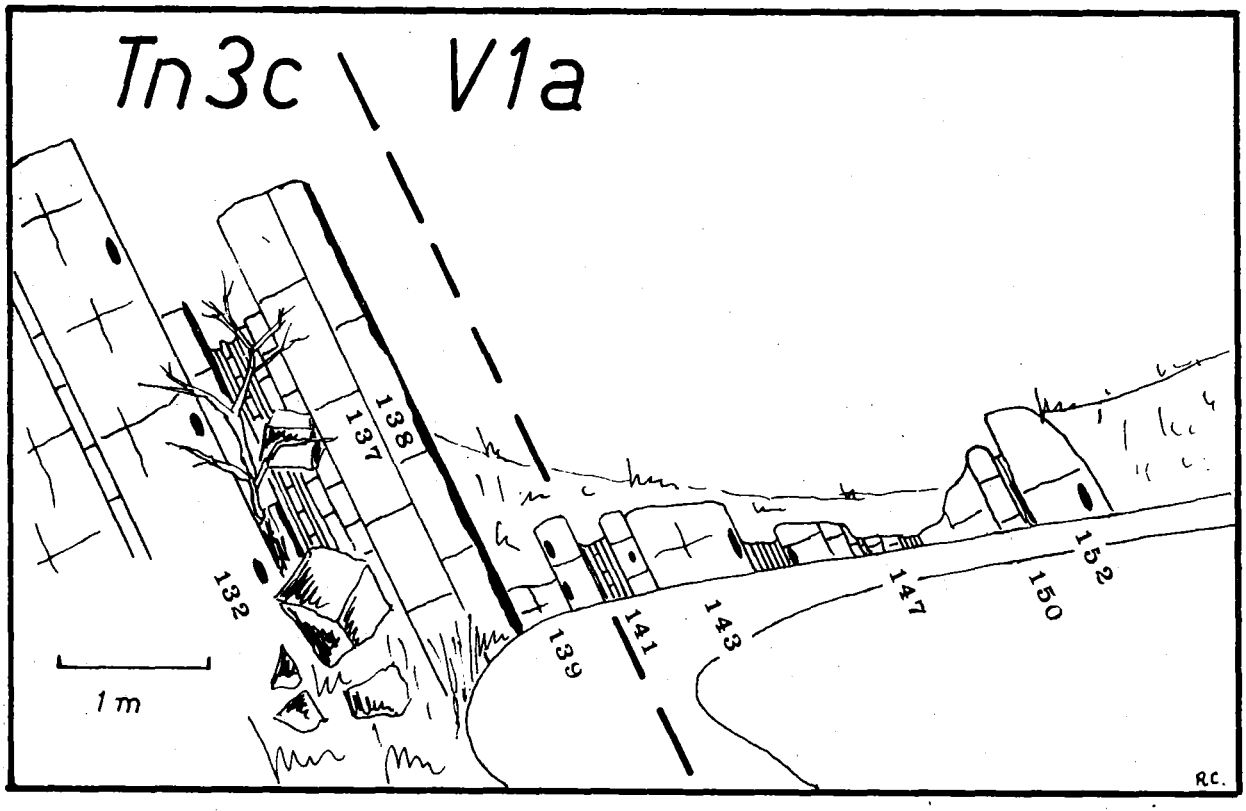
B③b (M.q.m. 64-66.)

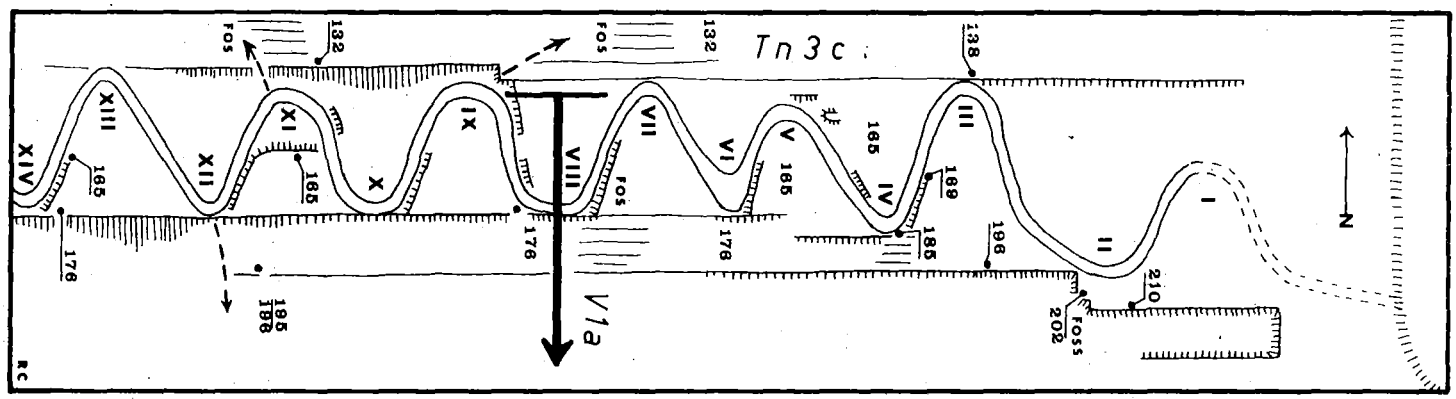

Marbre noir de Dinant
Carrière de marbre
Rochers N
e
d
249
248
217
196
174
166
141
122
Tetrataxis
Palaeosp. diversa
Pach. pachysphaerica
Brunsia
Eoparastaffella
Dainella
Melarchaediscus
Endosp. conili
Scaliognathus anchoralis
Gnath. cf. homopunctatus
Mestognathus beckmanni
66
65
64
10m

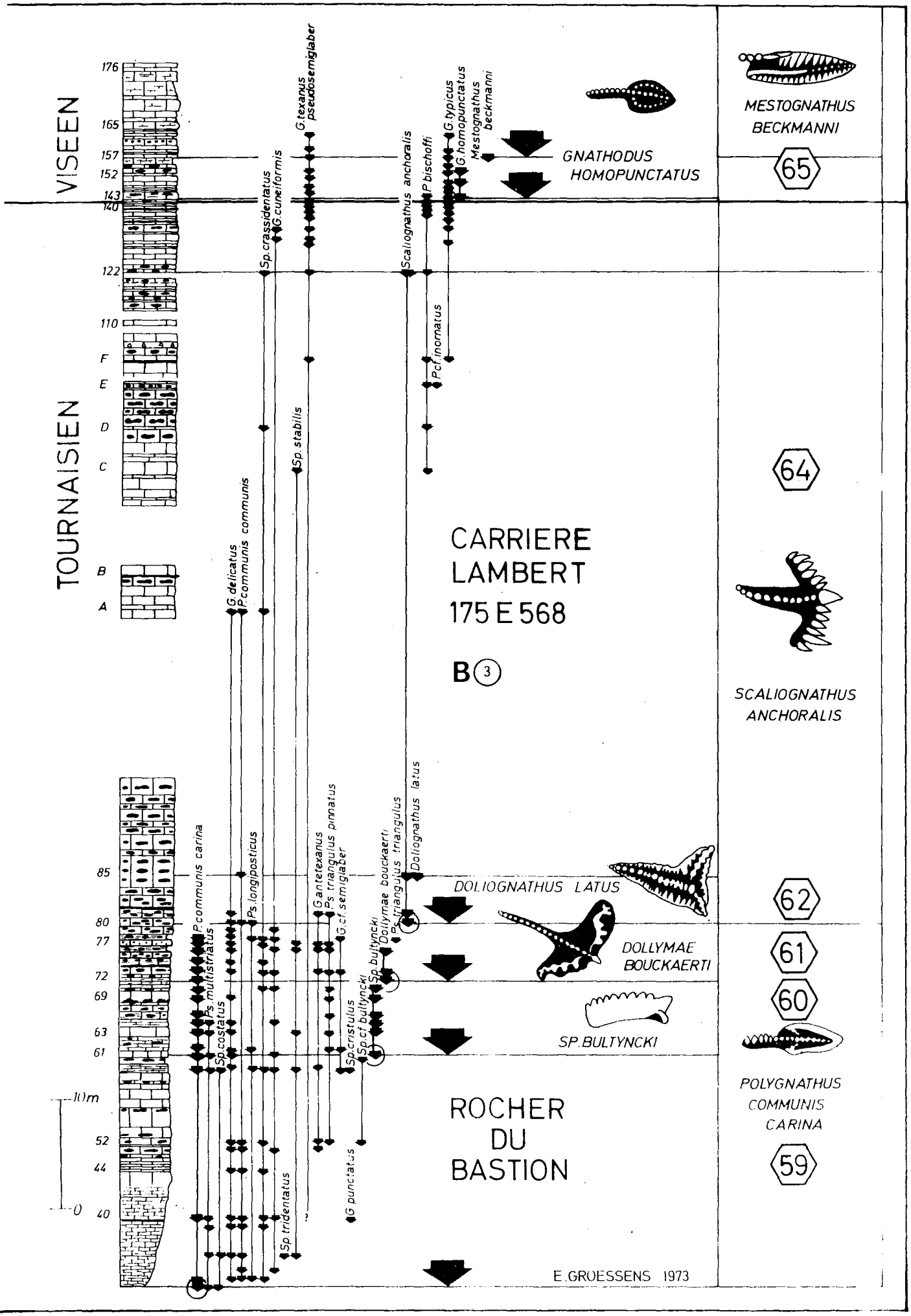
B ③ c (M.g.m.66-68)

Marbre noir
de Dinant
Quarry
rochers S
f
Girvanella densa
Brunsia
Tetrataxis
Endosp. conili
Melarchaedicus
Archaedicus
10m
68
?
66


STRATOTYPE DE LA LIMITE TOURNAISIEN - VISEEN
175 E 568
B ③
ROCHER DU BASTION
PACHYSPHAERINA
PACHYSPHAEROIDES
Pseudoglomospira
Dainella
Brunsia
Eoparastaffella
TETRATAXIDAE
ARCHAEDISCIDAE
Tournaisien
Viseen
0
10m
20m
Scathognathodus bultynckiSOUS-ZONE
Dollymae bouckaerti SOUS ZONE
Doliognathus latus SOUS-ZONE
Gnathodus semipunctatus SOUS ZONE
V1a V1b
CARRIERE LAMBERT
SCALIOGNATHUS ANCHORALIS ZONE
MESTOGNATHUS BECKMANNI ZONE
POLYGNATHUS COMMUNIS CARINUS ZONE
FAUBOURG St PAUL
ENCRINITE DU BAYARD
CALCAIRE DE LEFFE
CALCAIRE NOIR DE LA MOLIGNEE
E.GROESSENS 1972


Tn3c
V1a
132
137
138
139
141
143
147
150
152
1 m
RC.

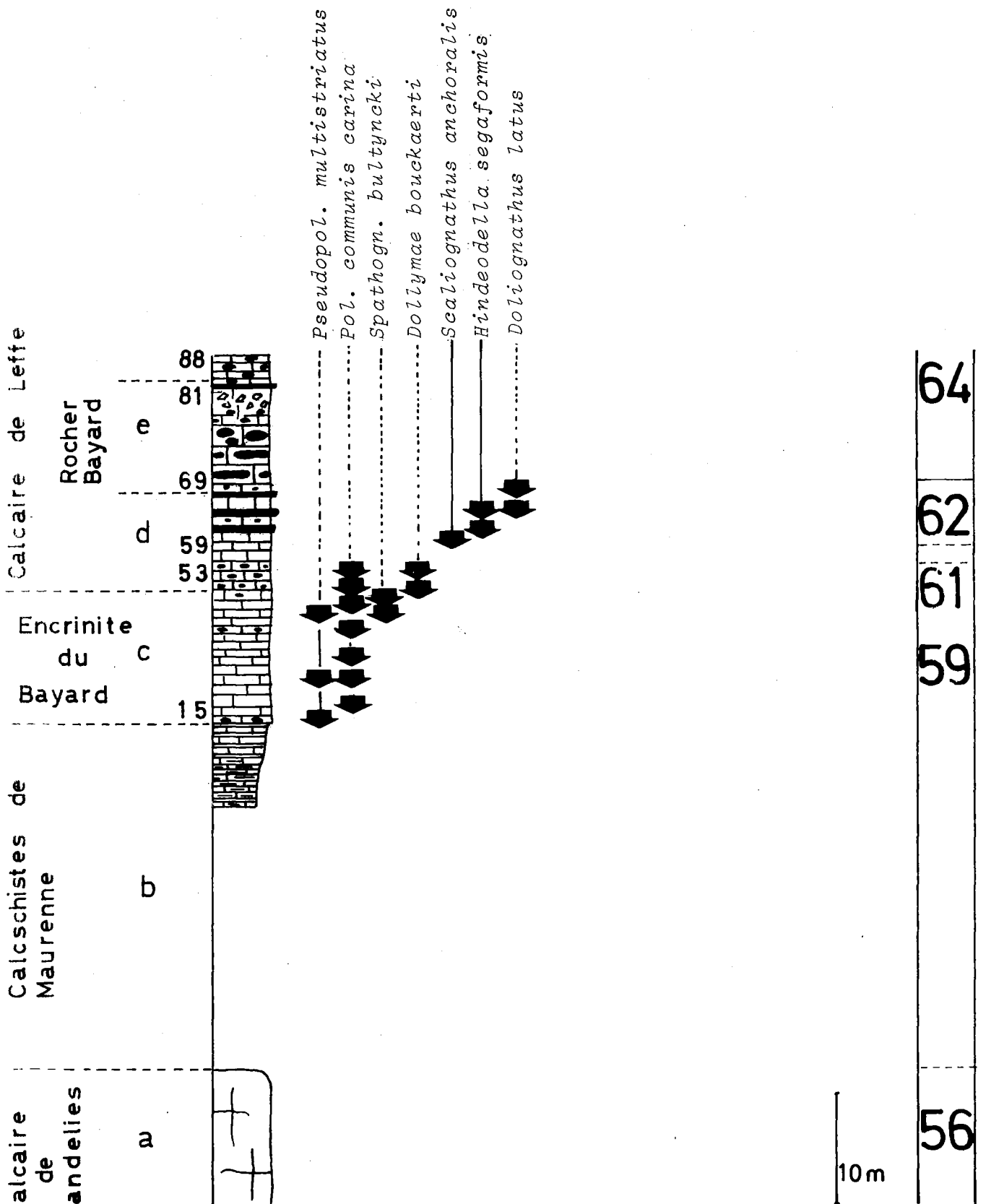

Tn3c
V1a
XIV
XIII
XII
XI
X
IX
VIII
VII
VI
V
IV
III
II
I
N
RC


VISEEN
TOURNAISIEN
176
165
157
152
143
140
122
110
F
E
D
C
B
A
85
80
77
72
69
63
61
52
44
40
10m
0
G.texanus pseudosemiglaber
Sp.crassidentatus
G.cuneiformis
Scaliognathus anchoralis
P.bischoffi
G.typicus
G.homopunctatus
Mestognathus beckmanni
P.cf.inornatus
Sp.stabilis
G.delicatus
P.communis communis
P.communis carina
Ps.longipostica
Ps.multistriatus
Sp.costatus
Sp.tridentatus
G.antetexanus
Ps.triangulus pinnatus
G.cf.semiglaber
Sp.cristulus
Sp.cf.bultyncki
Sp.bultyncki
Dollymae bouckaerti
Ps.triangulus triangulus
Doliognathus latus
G.punctatus
GNATHODUS HOMOPUNCTATUS
CARRIERE LAMBERT
175 E 568
B (3)
ROCHER DU BASTION
DOLIOGNATHUS LATUS
DOLLYMAE BOUCKAERTI
SP.BULTYNCKI
MESTOGNATHUS BECKMANNI
SCALIOGNATHUS ANCHORALIS
POLYGNATHUS COMMUNIS CARINA
65
64
62
61
60
59
E.GROESSENS 1973

BAYARD B④M.g.m.

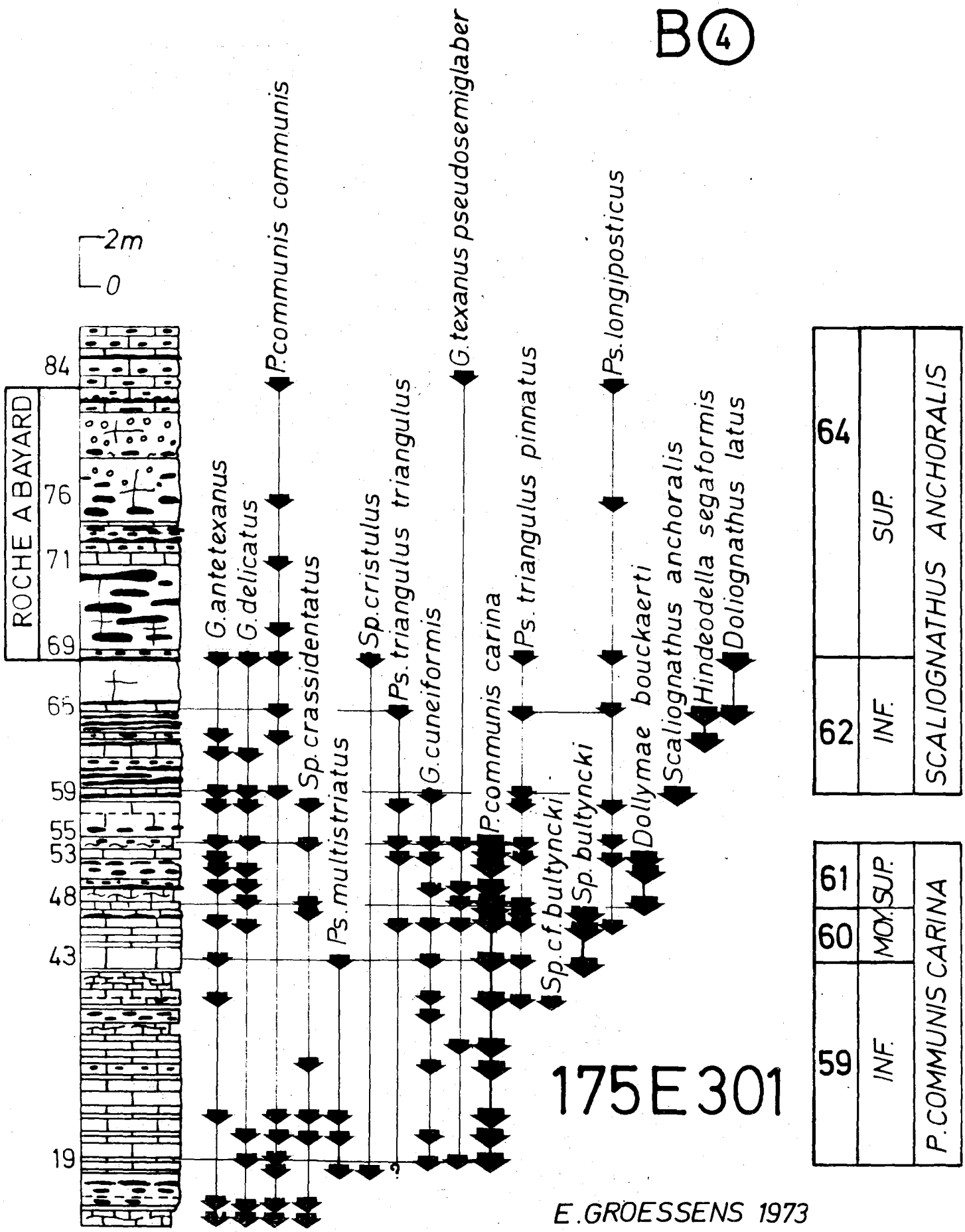
1968. R.CONIL, Ann.Soc.géol.Belg., 90, pp.695-696.

1969. R.CONIL, R.AUSTIN, M.LYS & F.RHODES, Bull.Soc.belge Géol. LXXVII, p.61, Dinant 5.

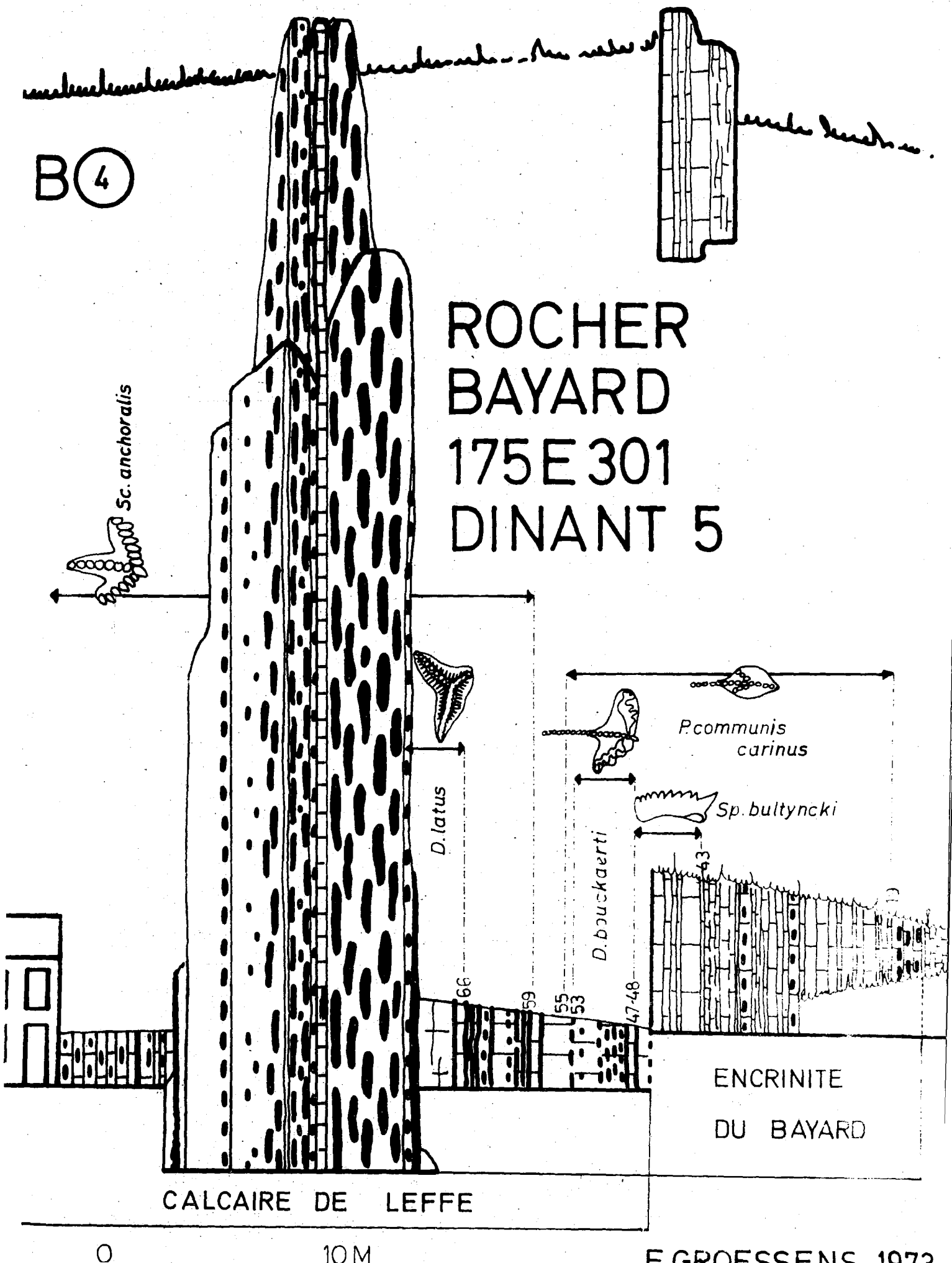


LA ROCHE A BAYARD

B ④



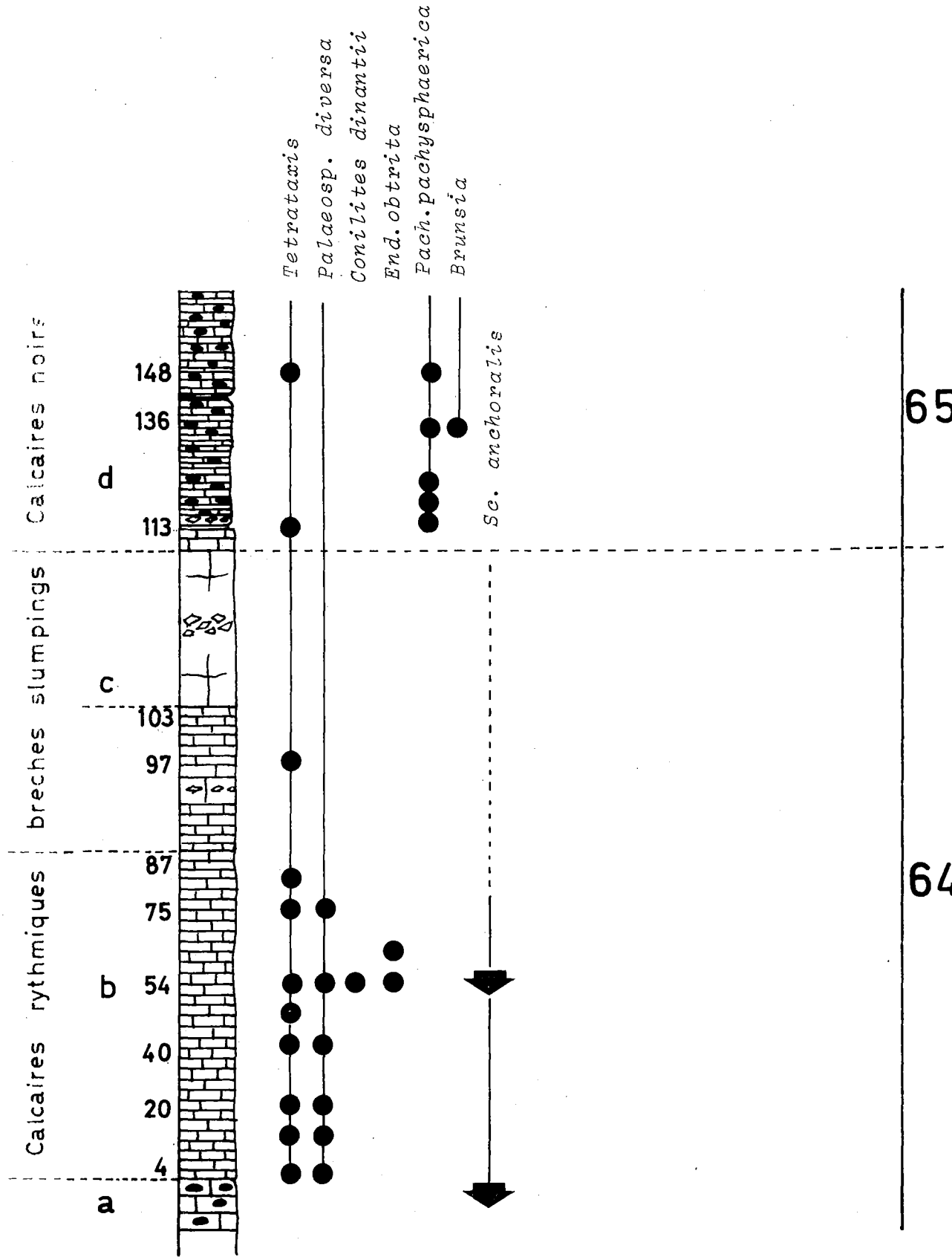
E.GROESSENS 1973


B 4
ROCHER
BAYARD
175E301
DINANT 5
Sc. anchoralis
D. latus
D. bouckaerti
P. communis carinus
Sp. bultyncki
99
69
55
53
47-48
63
ENCRINITE
DU BAYARD
CALCAIRE DE LEFFE
0
10 M
F. GROESSENS 1973

FREYR B⑤ (M.g.m.64-65)

1968. R.CONIL, Ann.Soc.géol.Belg.,90,pp.698-699,fig.6.

1969. H.DUPONT, Mém.Inst.géol.Univ.Louv.,XXIV,2,pp.120-123, fig.6, pls.XV,XVIII.



SALET B⑥a (M.g.m.58-64)

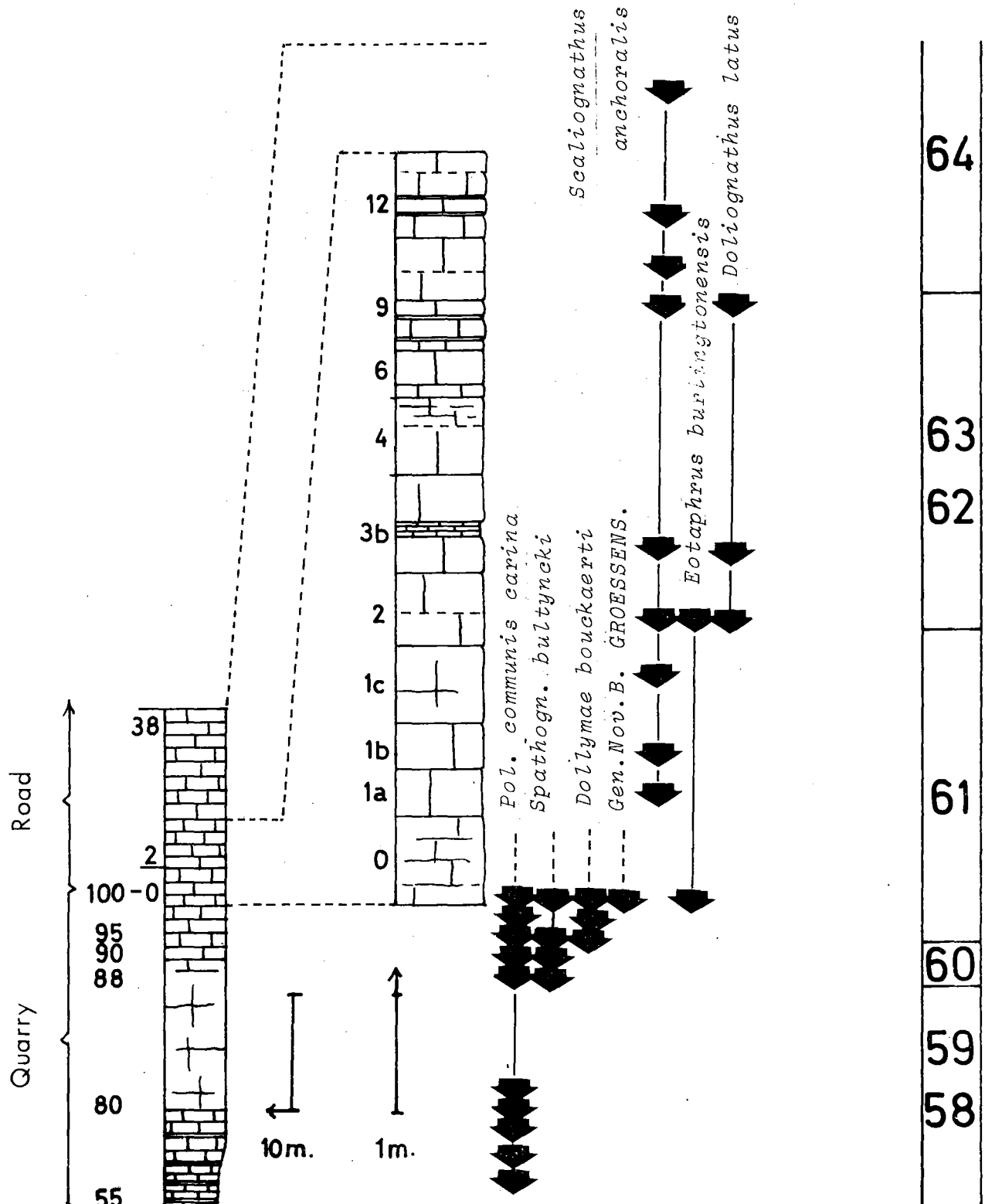
1965. B.MAMET, Inst.roy.Sc.nat.Belg.,Mém.151,route de Salet 30.

1968. R.CONIL, Ann.Soc.géol.Belg.,90,pp.712-714,figs 6,9.

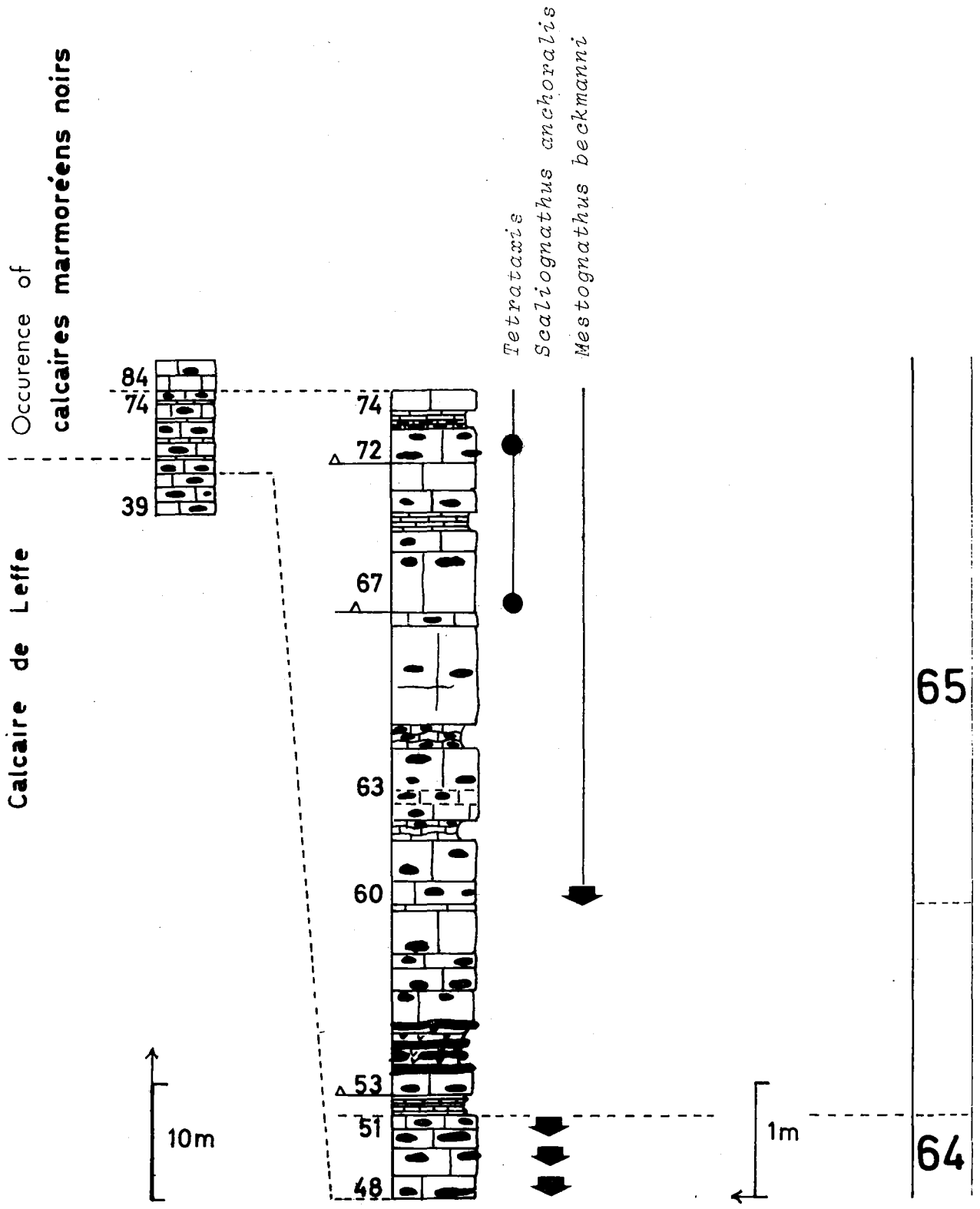
1970. R.CONIL & H.PIRLET, Congr.Coll.Univ.Liège,55,Strat.Carb. pp.52-54.

1971. J.BOUCKAERT, R.CONIL, A.DELMER, E.GROESSENS, G.MORTELMANS, H.PIRLET, M.STREEL, J.THOREZ, Prof.Paper Serv.géol.Belg., n°2, pp.12,18.

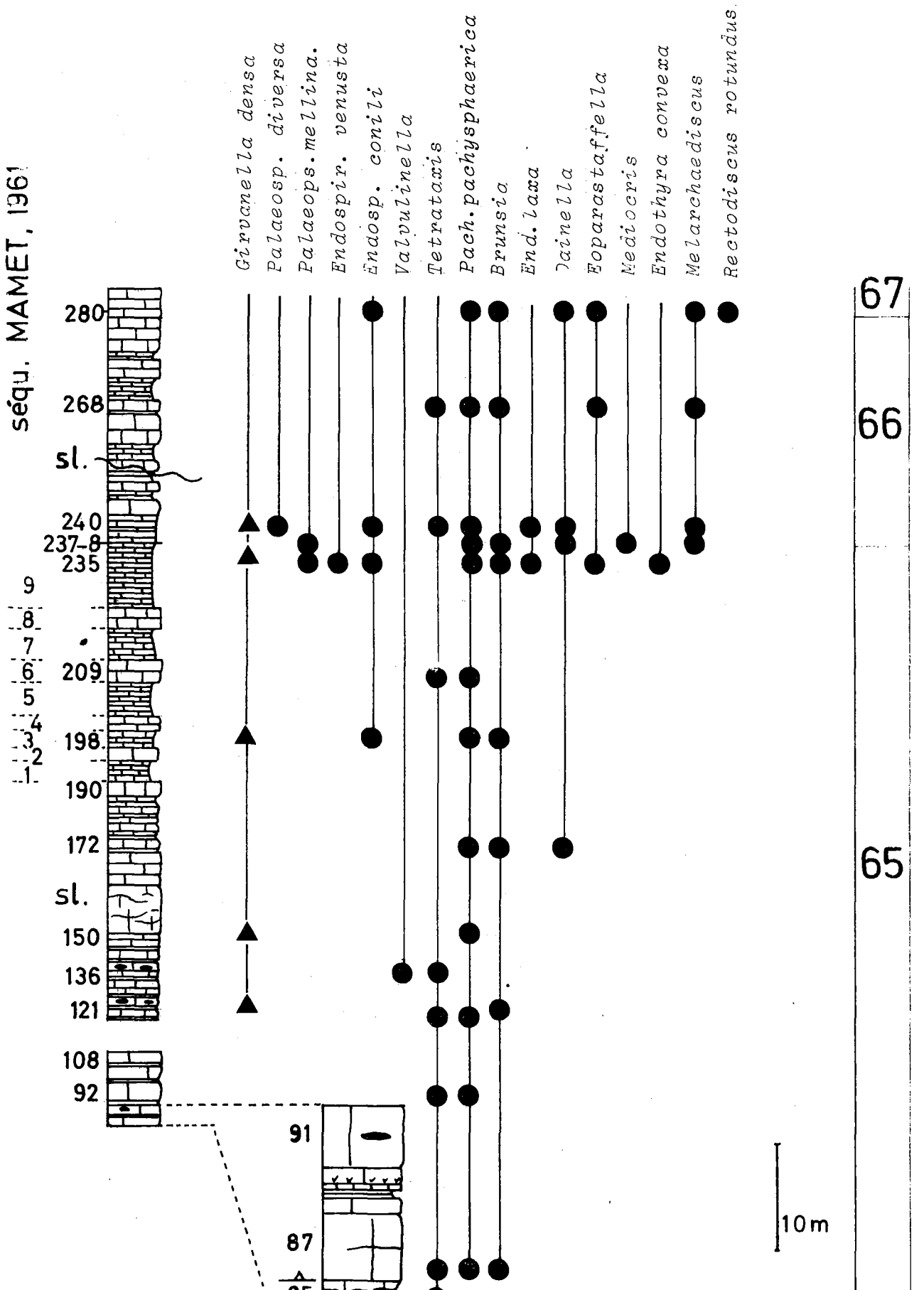
1974. E.GROESSENS, R.CONIL & A.LEES, Soc.belge Géol.,vol.Biostr. Microp.Dinantien.



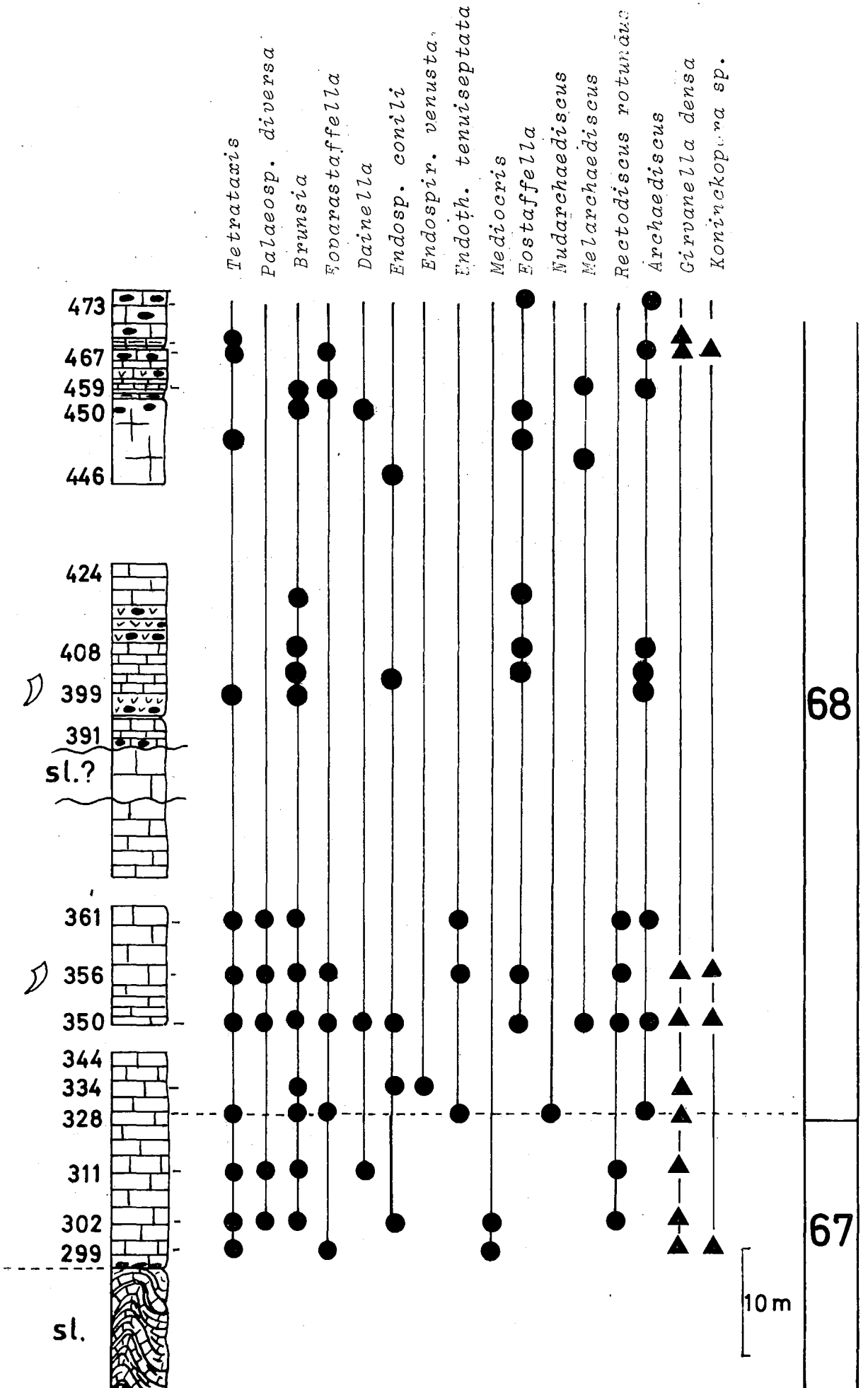
B ⑥ b (M.g.m. 64-65)


Occurence of
calcaires marmoréens noirs
Calcaire de Leffe
84
74
39
74
72
67
63
60
53
51
48
10m
Tetrataxis
Sealiognathus anchoralis
Mestognathus beckmanni
65
64
1m

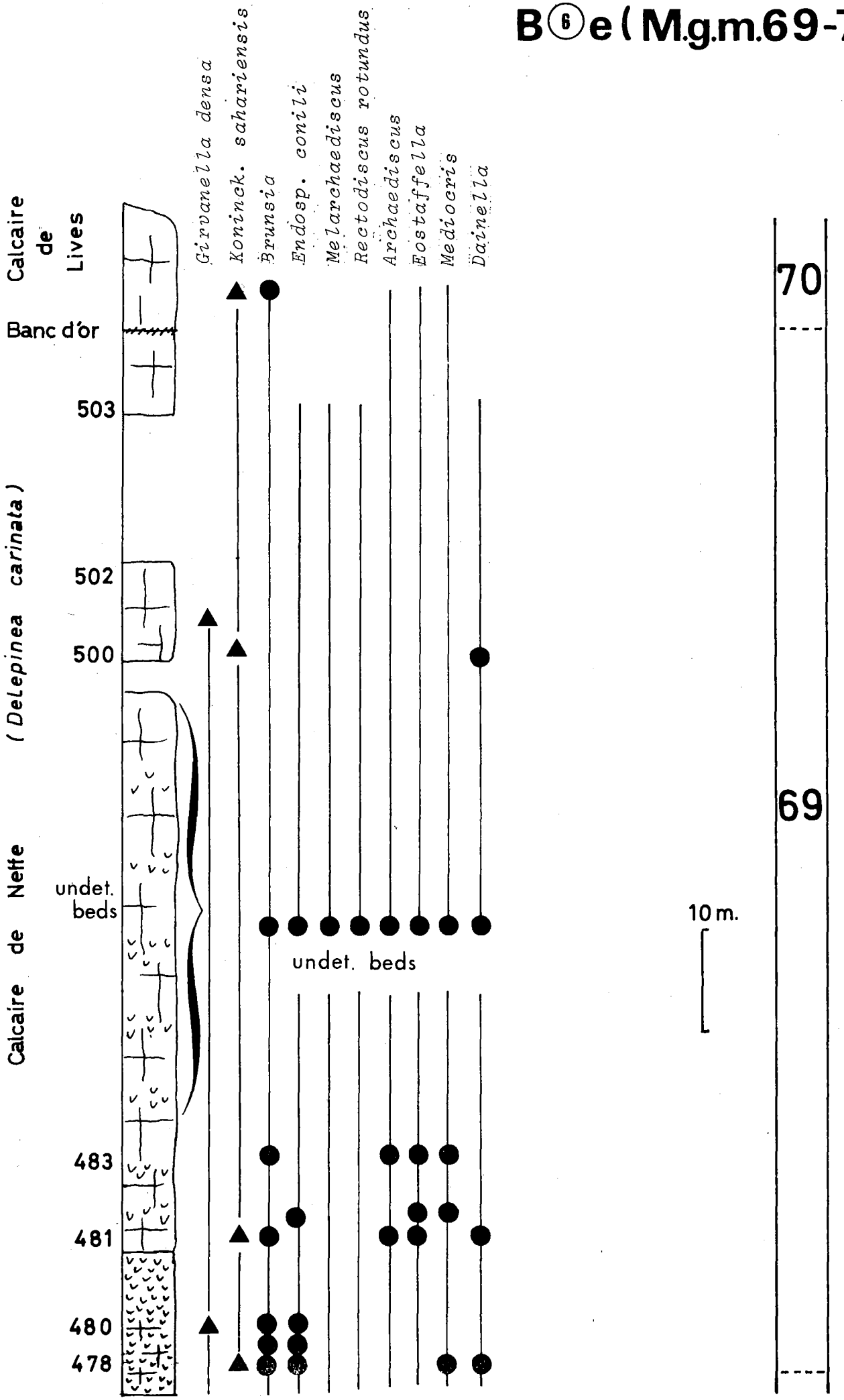
B⑥c (Mgm. 65-67)

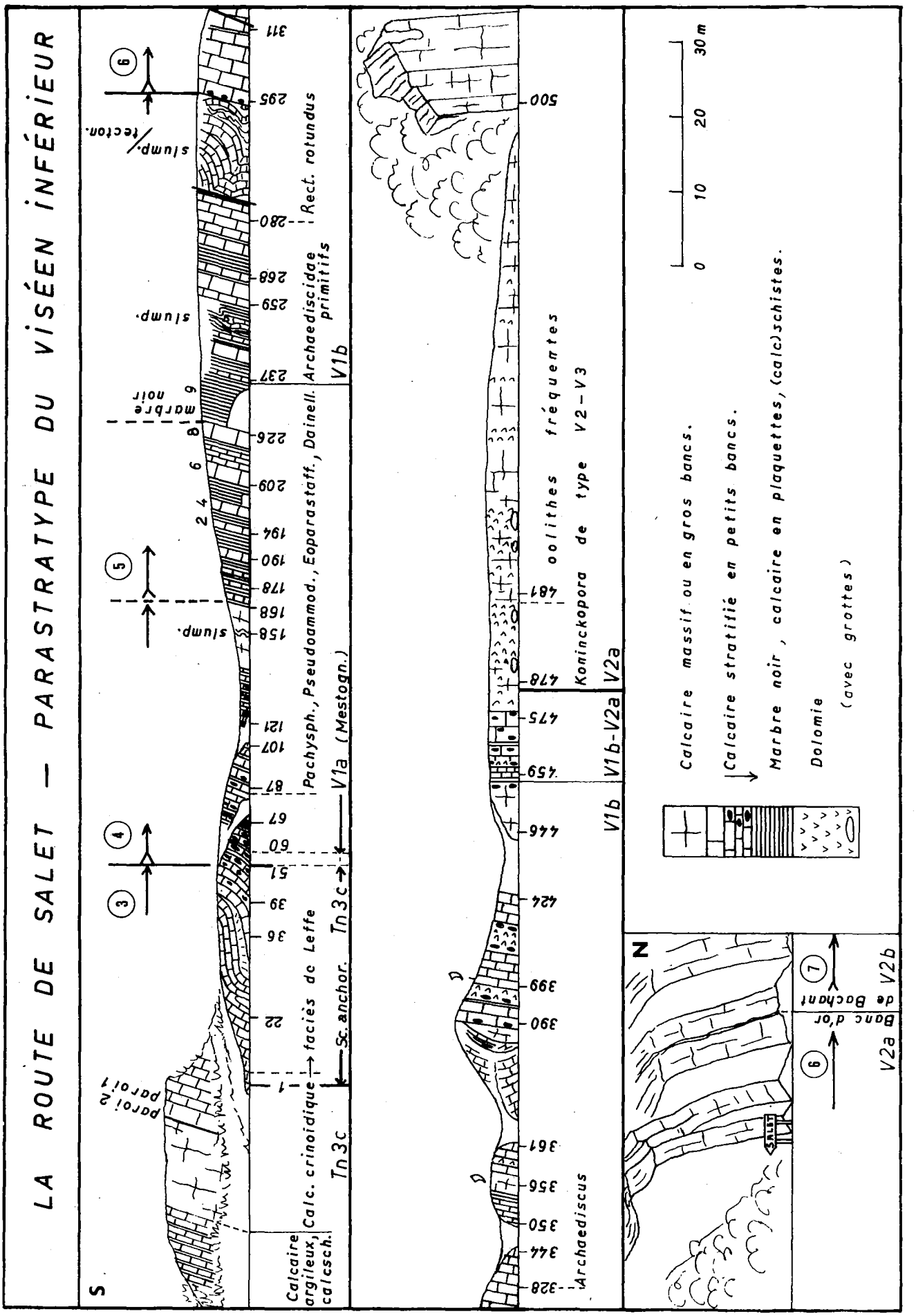

séqu. MAMET, 1961
280
268
sl.
240
237-8
235
9
8
7
6
209
5
4
3
2
198
1
190
172
sl.
150
136
121
108
92
91
87
Ginvanella densa
Palaeosp. diversa
Palaeops. mellina.
Endospir. venusta
Endosp. conili
Valvulinella
Tetrataxis
Pach. pachysphaerica
Brunsia
End. laxa
Jainella
Eoparastaffella
Mediocris
Endothyra convexa
Melarchaediscus
Rectodiscus rotundus
67
66
65
10m

B⑥d (M.g.m.67-68)


Tetrataxis
Palaeosp. diversa
Brunsia
Eovarastaffella
Dainella
Endosp. conili
Endospir. venusta
Endoth. tenuiseptata
Mediocris
Postaffella
Nudarchaediscus
Melarchaediscus
Rectodiscus rotundus
Archaediscus
Girvanella densa
Koninckopora sp.
473
467
459
450
446
424
408
399
391
sl.?
361
356
350
344
334
328
311
302
299
sl.
68
67
10 m

B⑥e (M.g.m.69-70)

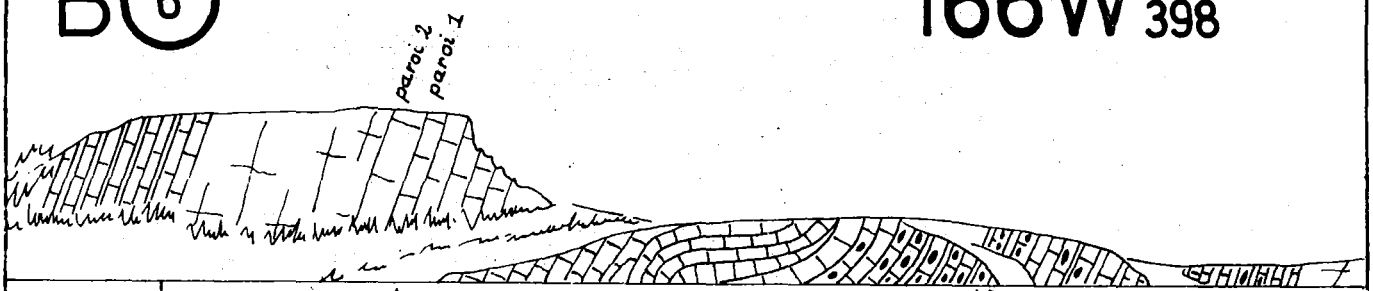

Girvanella densa
Koninck. sahariensis
Brunsia
Endosp. conili
Melarchaedicus
Rectodiscus rotundus
Archaedicus
Eostaffella
Mediocris
Dainella
Calcaire de Lives
Banc d'or
503
502
500
Calcaire de Nette (Delepinea carinata)
undet. beds
483
481
480
478
undet. beds
70
69
10 m.


LA ROUTE DE SALET — PARASTRATYPE DU VISÉEN INFÉRIEUR
S
N
Calcaire argileux, calcsch.
Calc. crinoidique → faciès de Leffe
Sc. anchor.
Tn 3c
Tn 3c →
V1a (Mestogn.)
Pachysph., Pseudoammod., Eoparastaff., Dainell.
Archaediscidae primitifs
Rect. rotundus
V1b
marbre noir
slump.
slump/rection.
Paroi 1
Paroi 2
Archaediscus
Koninckopora de type V2-V3
oolithes fréquentes
V1b
V1b-V2a
V2a
Calcaire massif ou en gros bancs.
Calcaire stratifié en petits bancs.
Marbre noir, calcaire en plaquettes, (calc)schistes.
Dolomie
(avec grottes)
0
10
20
30 m
Banc d'or
de Bachant
V2a
V2b
SALET

LA ROUTE DE SALET

B⑥

166W 91/398



88 95 0 2 9 36 51 60 67 87 107 121 158

Calcaire argileux, calcsch.

Calc. crinoïdique ⟶ facies de Leffe

Tetr.: Pachysph., Pseudoammod., Eoparastaff., Dainella.

P.communis carinus

Scaliognathus anchoralis

Doliognathus latus

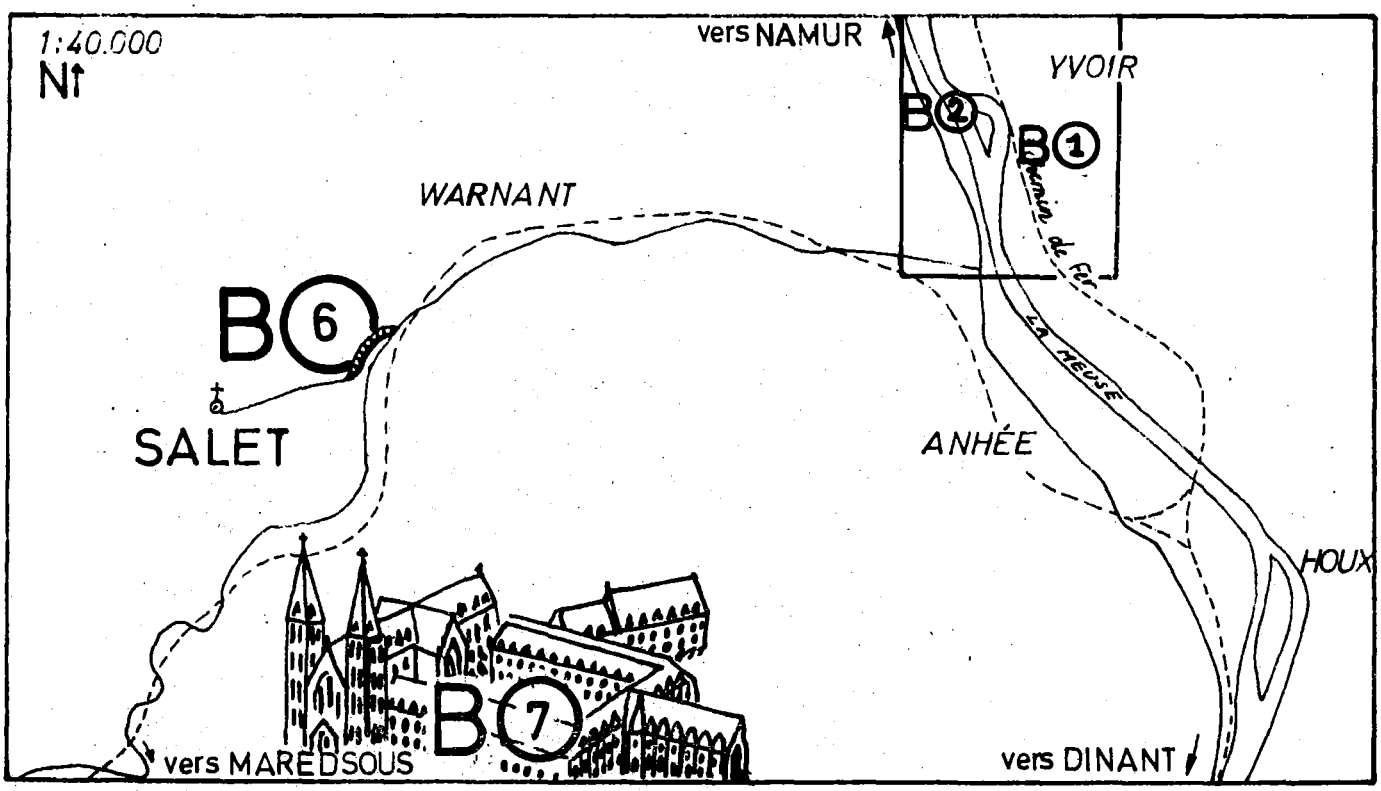
Sp. bultyncki

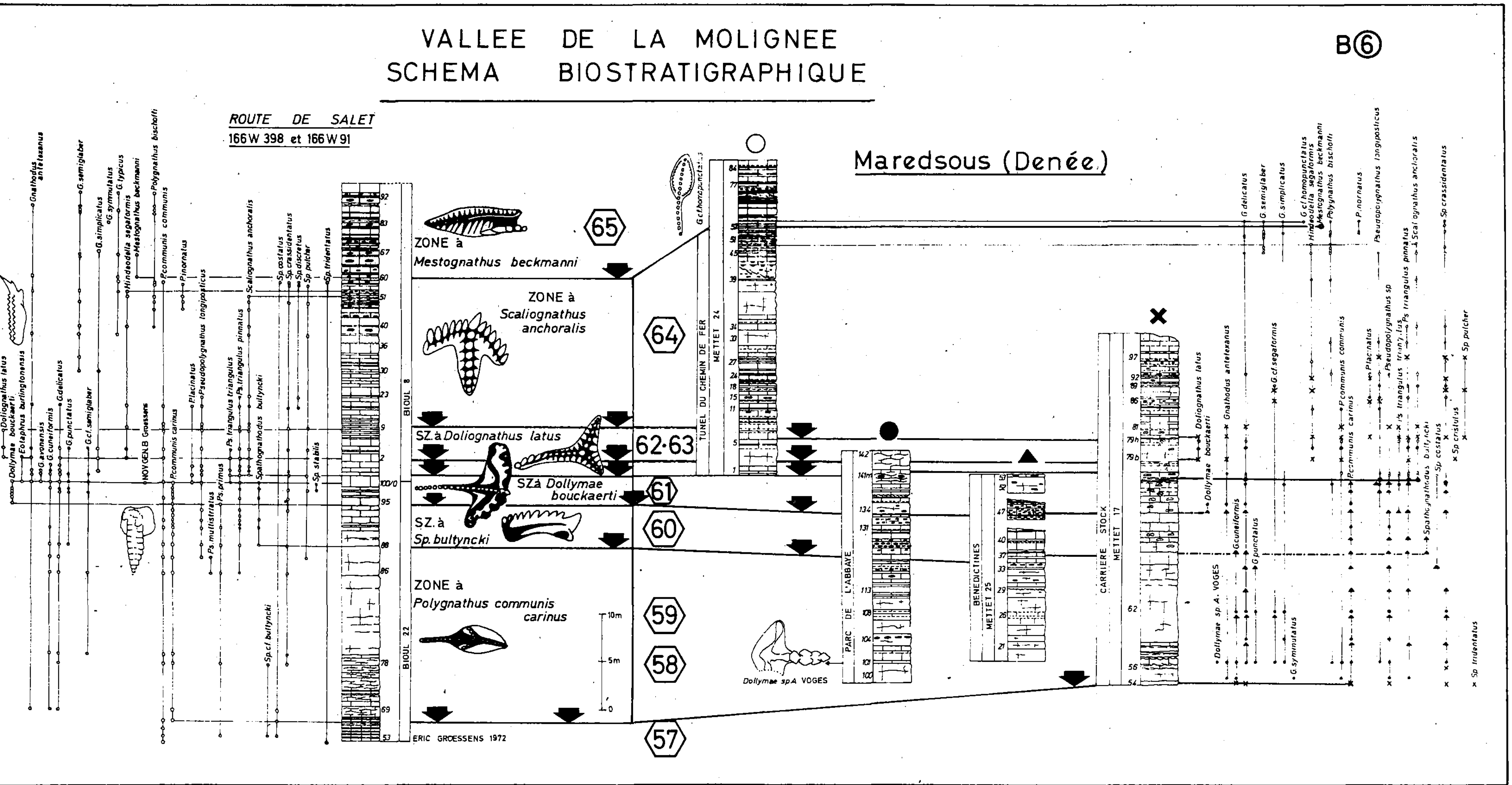
Dollymae bouckaerti

Mestognathus beckmanni

GROESSENS E 1971

0 10 20 30m




VALLEE DE LA MOLIGNEE
SCHEMA BIOSTRATIGRAPHIQUE
B6
ROUTE DE SALET
166W 398 et 166W91
Maredsous (Denée)
ZONE à Mestognathus beckmanni
ZONE à Scaliognathus anchoralis
SZ. à Doliognathus latus
SZà Dollymae bouckaerti
SZ. à Sp. bultyncki
ZONE à Polygnathus communis carinus
65
64
62-63
61
60
59
58
57
BIOUL 8
BIOUL 22
TUNEL DU CHEMIN DE FER
METTET 24
PARC DE L'ABBAYE
BENEDICTINES
METTET 25
CARRIERE STOCK
METTET 17
Dollymae sp.A VOGES
NOV.GEN.B Groessens
ERIC GROESSENS 1972
10m
5m
0

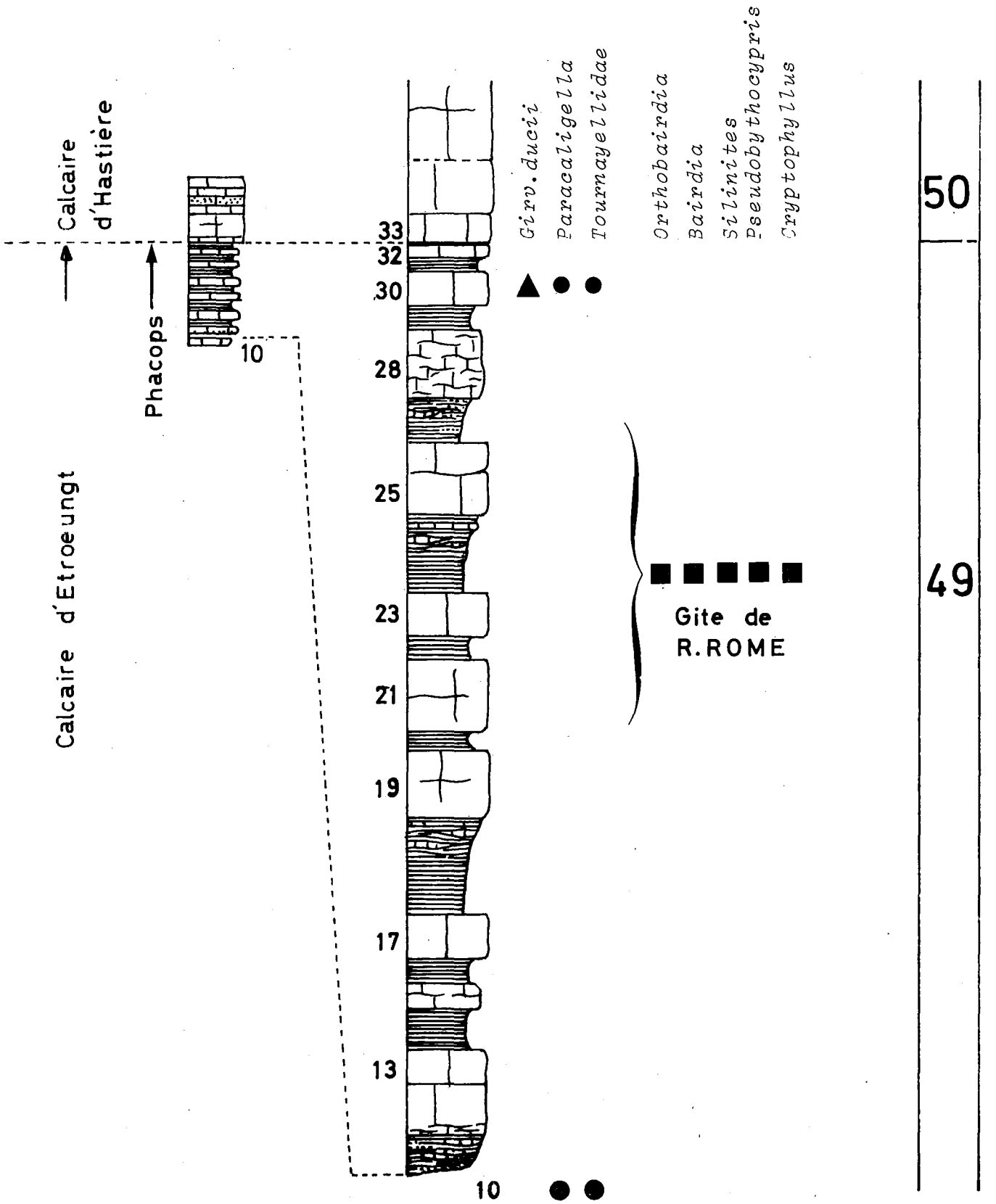
DENEE B⑦ (M.g.m.49-50)

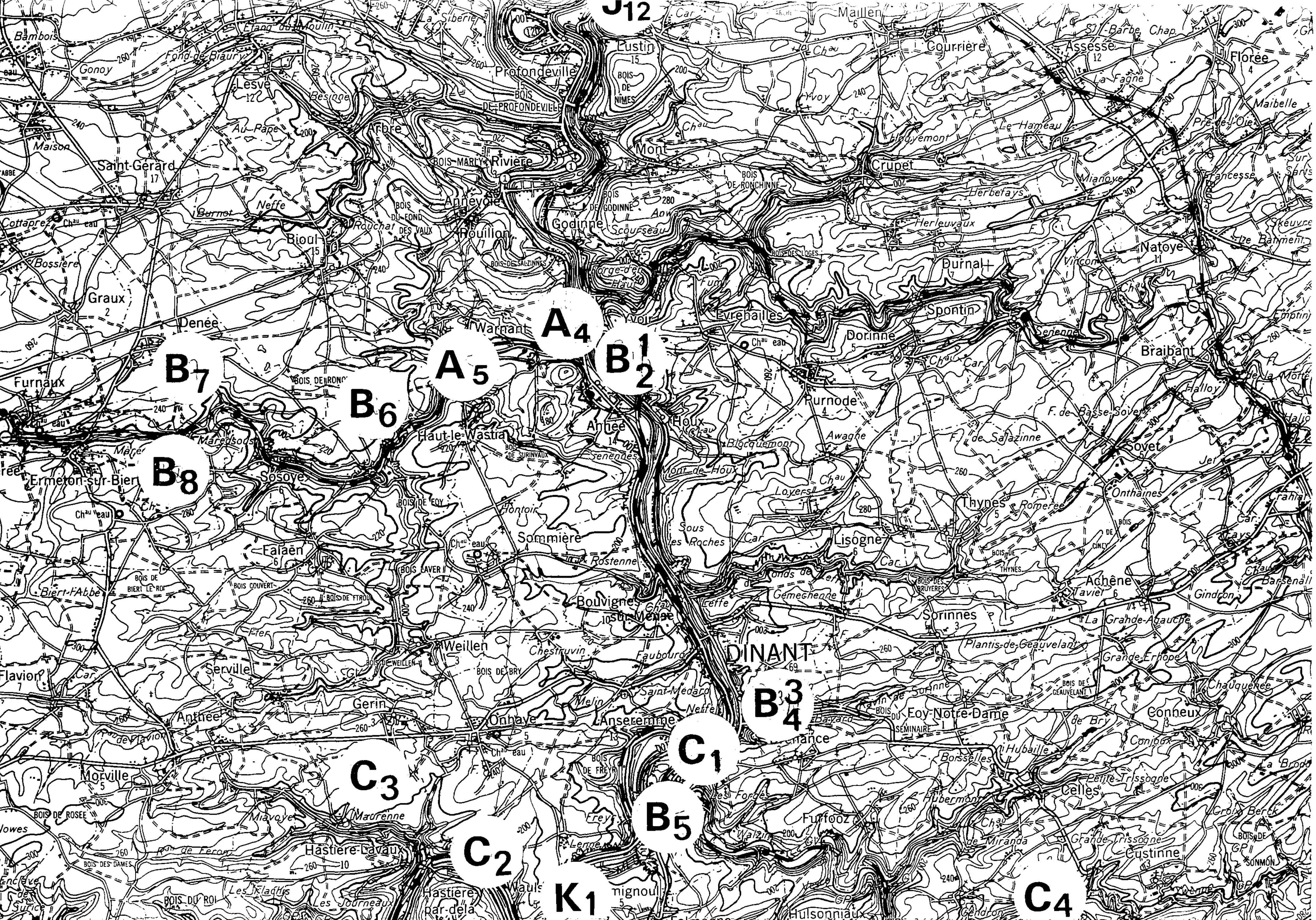
1960. R.ROME & J.GOREUX, Mém.Inst.géol.Univ.Louv.XXI,pp.185-204.

1964. R.CONIL, M.LYS & E.PAPROTH, Acad.Roy.belg.Cl.Sc.,Mém.4°, 2,XV,4,pp.39-41.

1968. R.CONIL, Ann.Soc.géol.Belg.,90,p.725,h.t.III.

1971. R.ROME, Mém.Inst.géol.Univ.Louv.,XXVII, 1,pp.8,9,45.




J12
A4
A5
B1 2
B3 4
B5
B6
B7
B8
C1
C2
C3
C4
K1
DINANT
Profondeville
Lustin
Godinne
Yvoir
Anhée
Annevoie
Rouillon
Warnant
Haut-le-Wastia
Sosoye
Maredsous
Denée
Furnaux
Ermeton-sur-Biert
Falaën
Sommière
Bouvignes-sur-Meuse
Weillen
Onhaye
Anseremme
Hastière-Lavaux
Hastière-par-delà
Spontin
Dorinne
Purnode
Evrehailles
Crupet
Assesse
Courrière
Florée
Natoye
Braibant
Sovet
Thynes
Lisogne
Achêne
Sorinnes
Foy-Notre-Dame
Furfooz
Celles
Custinne
Conneux
Lesve
Saint-Gérard
Bioul
Graux
Flavion
Anthée
Morville
Serville
Gerin

MINISTRY OF ECONOMIC AFFAIRS
ADM. MINES - GEOLOGICAL SURVEY OF BELGIUM
13 Jennerstreet - 1040 Brussels - Belgium

INTERNATIONAL SYMPOSIUM ON

NAMUR 1974

BELGIAN MICROPALEONTOLOGICAL LIMITS

FROM EMSIAN TO VISEAN – SEPTEMBER 1st to 10th

EXCURSION C

Guides :

BOUCKAERT J.
CONIL R. (leader)
GROESSENS E.
STREEL M.
SANDBERG C.

GUIDEBOOK

Edited by

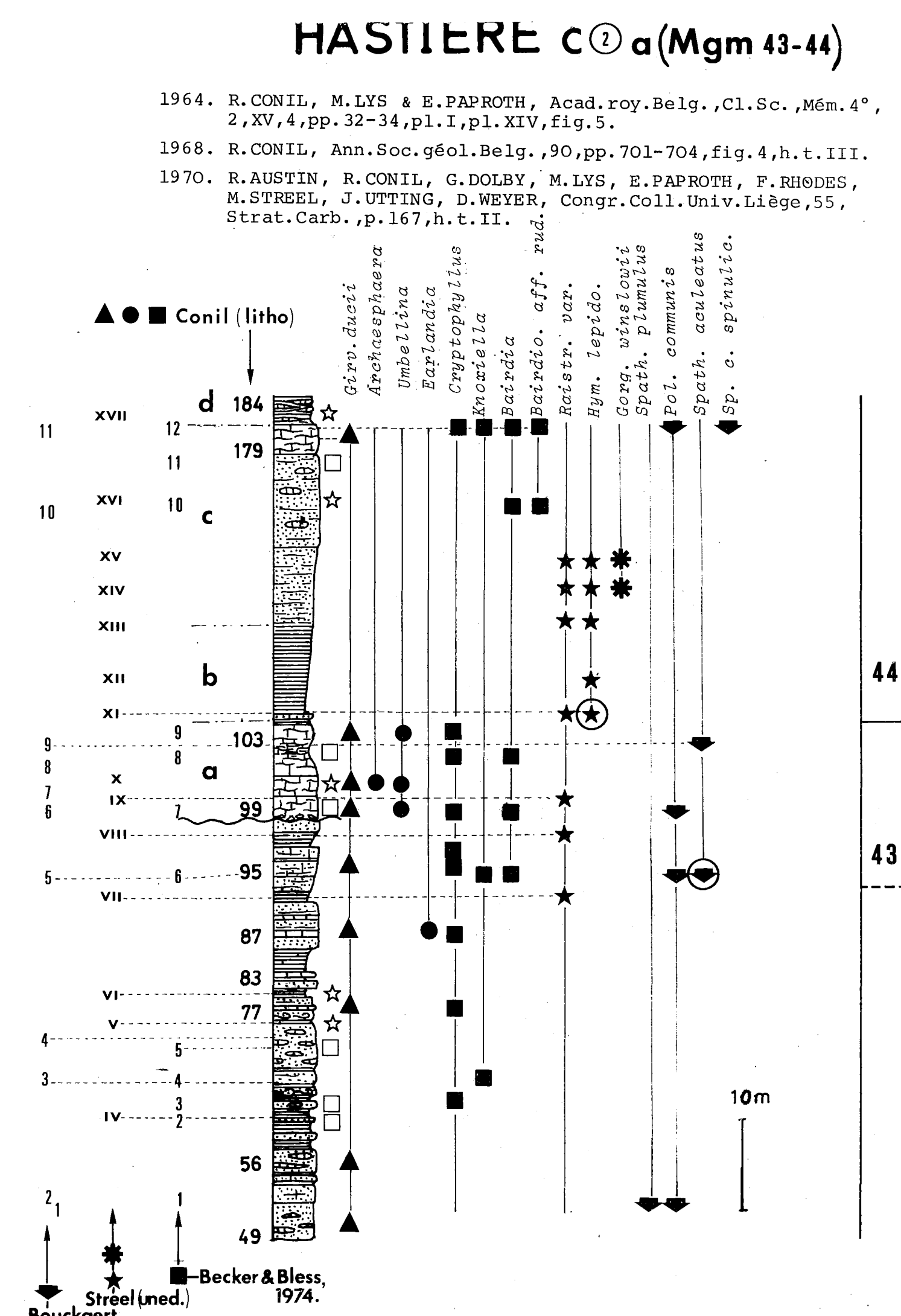
J. BOUCKAERT & M. STREEL

HASTIERE C② a (Mgm 43-44)

1964. R.CONIL, M.LYS & E.PAPROTH, Acad.roy.Belg.,Cl.Sc.,Mém.4°, 2,XV,4,pp.32-34,pl.I,pl.XIV,fig.5.

1968. R.CONIL, Ann.Soc.géol.Belg.,90,pp.701-704,fig.4,h.t.III.

1970. R.AUSTIN, R.CONIL, G.DOLBY, M.LYS, E.PAPROTH, F.RHODES, M.STREEL, J.UTTING, D.WEYER, Congr.Coll.Univ.Liège,55, Strat.Carb.,p.167,h.t.II.



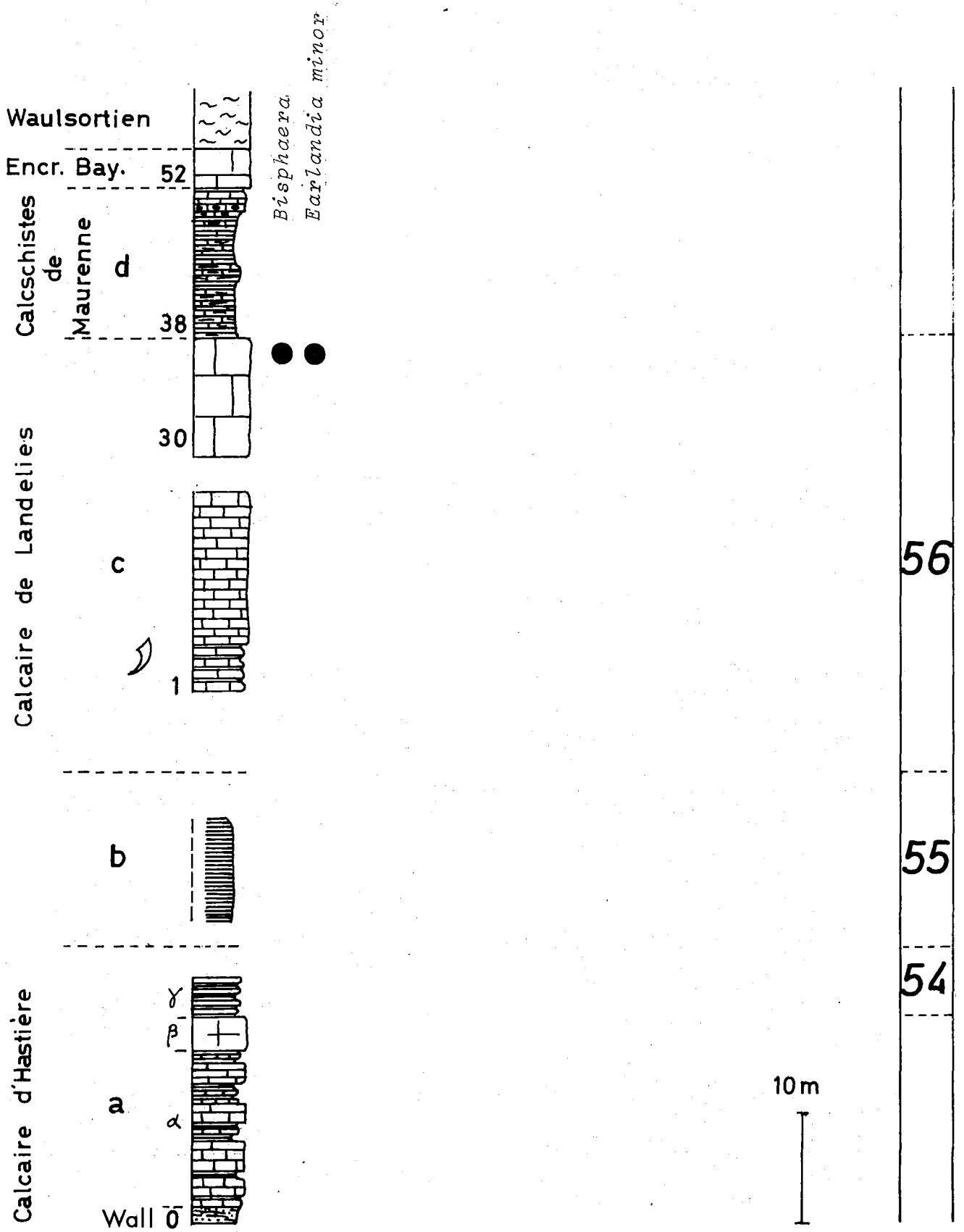
C ② b (Mgm 47-52)

10 m
Calc. d' Hastière
Conil 1964
353
319
310
Calcaire d'Etroeungt
Strunien calcaire
264
258
f
237
Strunien grèseux
de l' Epinette
226
222
e
199
Strunien schisteux
d
189
Couches
Becker & Bless, 1974:
Streel (uned.)
Bouckaert (uned.)
XXIII
XXII
XXI
XX
XIX
XVIII
10
15
19
18
14
17
13
14
12
Giv. ducii, G. weth.
Paracaligella
Quas. communis
Quas. com. radiata
Quasiend. kobeitusana
End. parakosvensis
Tournayellidae
Cryptophyllus
Cryptoph. sp. 17
Cavellina sp. 36
Knoxiella
Bairdia
Raistr. variabilis
Hym. lepidophytus
Gorg. winslowii
Spath. plumulus
Pol. communis
Spath. aculeatus
Protogm. kockeli
Pol. nov. sp.
Spath. anteposic.
Pseudopol. vogesi
52
51
47

MAURENNE C③ (M.g.m.54-57)

1964. R.CONIL, M.LYS & E.PAPROTH, Acad.roy.Belg.,Cl.Sc.,Mém.4°, 2,XV,4.

1968. R.CONIL, Ann.Soc.géol.Belg.,90,h.t.III.

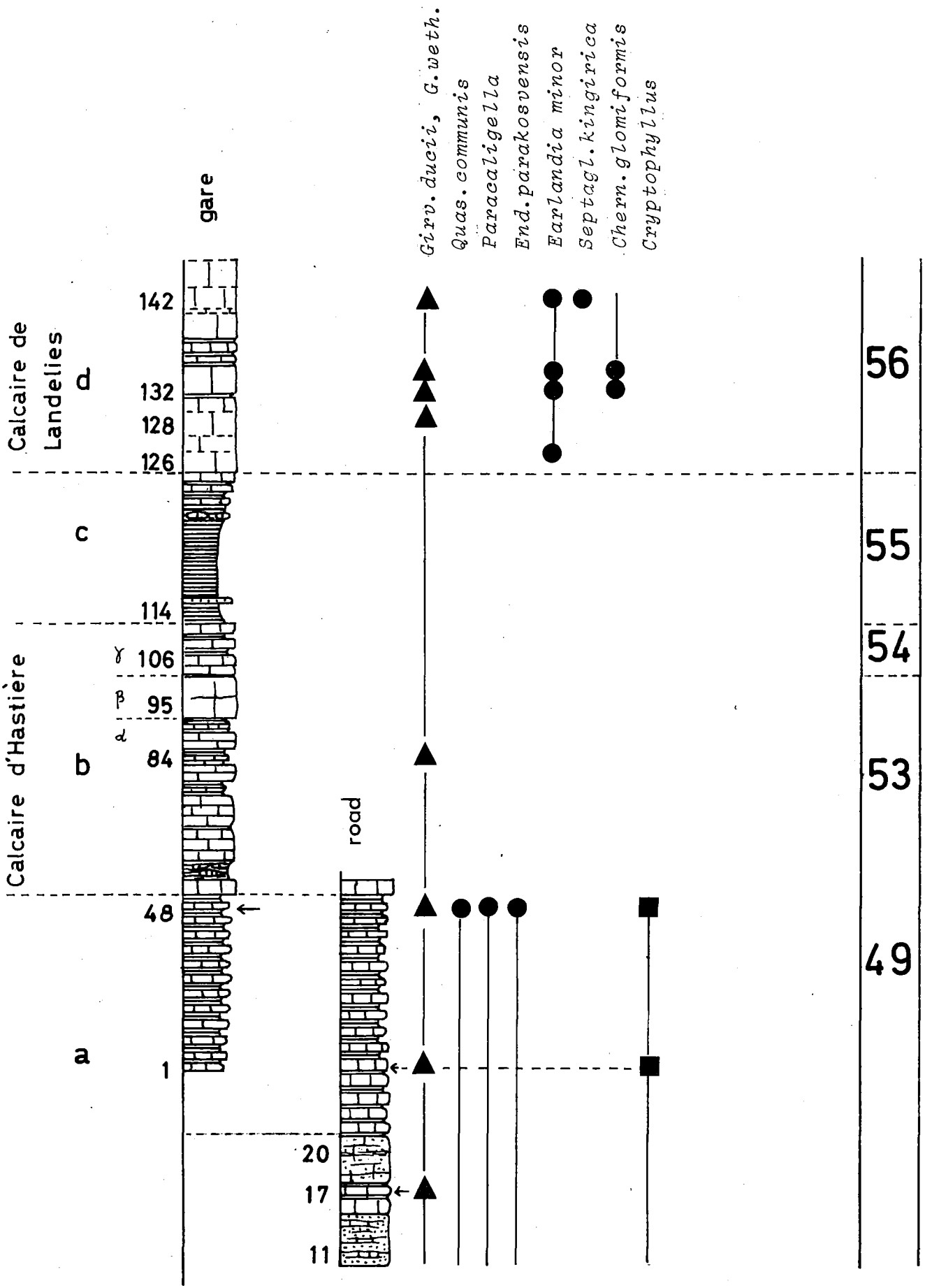


GENDRON-CELLES C④a (M.g.m.49-56)

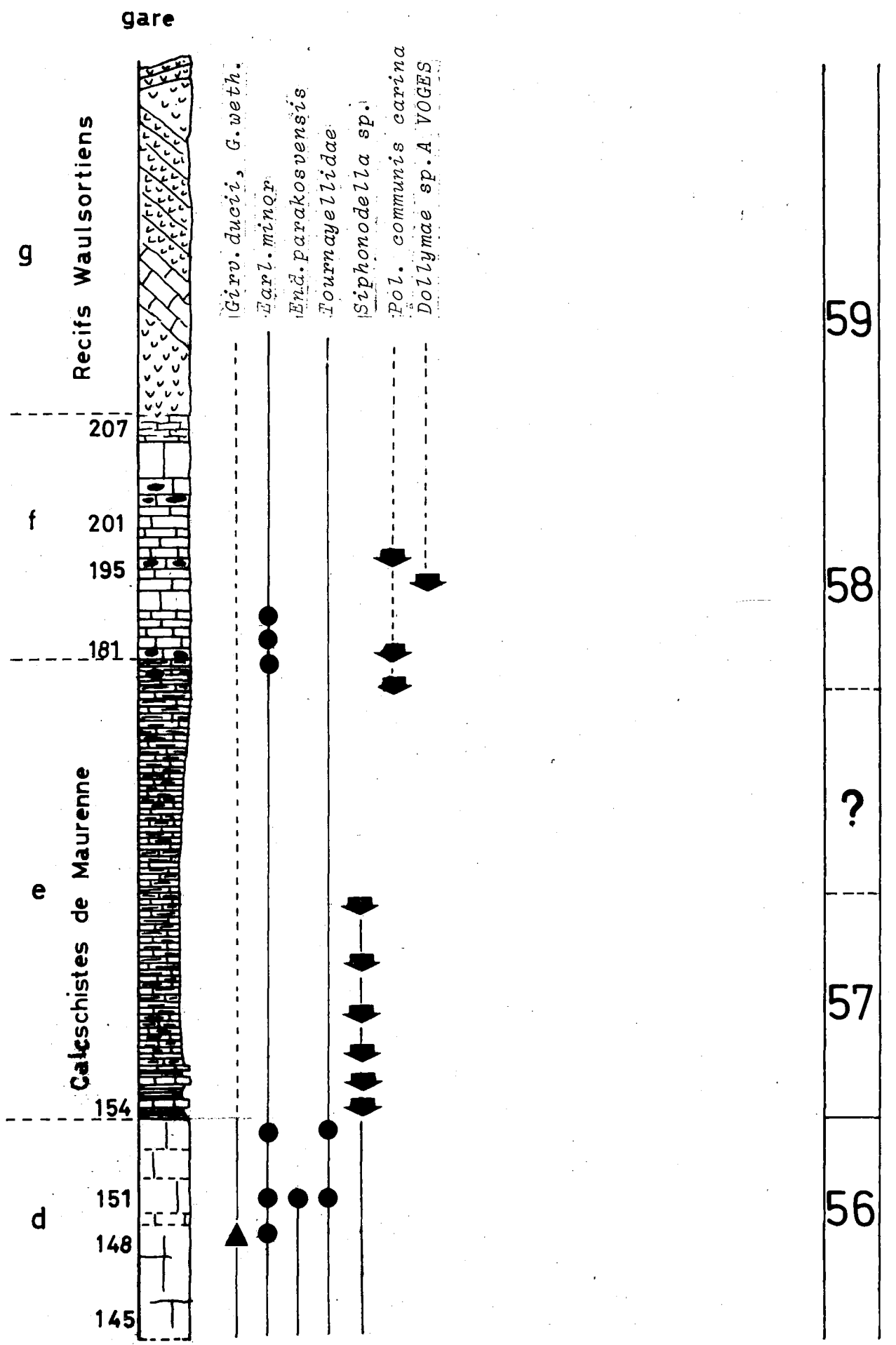
1895. H.deDORLODOT, Ann.Soc.géol.Nord,XXIII,p.219.

1964. R.CONIL, M.LYS & E.PAPROTH, Acad.roy.Belg.,Cl.Sc.,Mém.4°, 2,XV,4.

1968. R.CONIL, Ann.Soc.géol.Belg.,90,pp.704-705,h.t.III,figs.5,6.

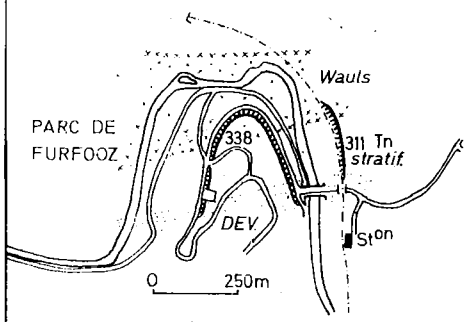


C④b (M.g.m.56-59)


gare
g
Recifs Waulsortiens
207
f
201
195
181
e
Calcschistes de Maurenne
154
d
151
148
145
Giv. ducii, G.weth.
Earl. minor
End. parakosvensis
Tournayellidae
Siphonodella sp.
Pol. communis carina
Dollymae sp. A VOGES
59
58
?
57
56

GENDRON-CELLES

C④



175 E
338

175 E
311

FORMATION DE WAULSORT

FORMATION DU BAYARD

FORMATION DE MAURENNE

FORMATION DE LANDELIES

FORMATION DU PONT D'ARCOLE

FORMATION D'HASTIERE

"STRUNIEN"

201
195
181
180
173
172
170
169b
169a
161
160
156
153
151
141
136
132
128
126
120
118
113
111
27
21
16
10m
0

G.delicatus
Pcom.car.
Ps tr.pinnatus
Pcom.com.
G.cf.semiglaber
Ps.multistriatus
Ps.tr.inaequalis
Dollymae sp.A VOGES
G.punctatus
Sp.tridentatus
Ps.sp
P.ornatus
S.obsoleta
Ps.dentilineatus
Siphonodella sp
S.cooperi
Prot.kockeli
?P.n.sp.A
Pelekysgnathus sp.

POLYGNATHUS COMMUNIS CARINA — 59

DOLLYMAE SP.A — 58

INTERZONE — 57

SIPHONODELLA — 56

55

54

51

?Polygnathus n.sp.A

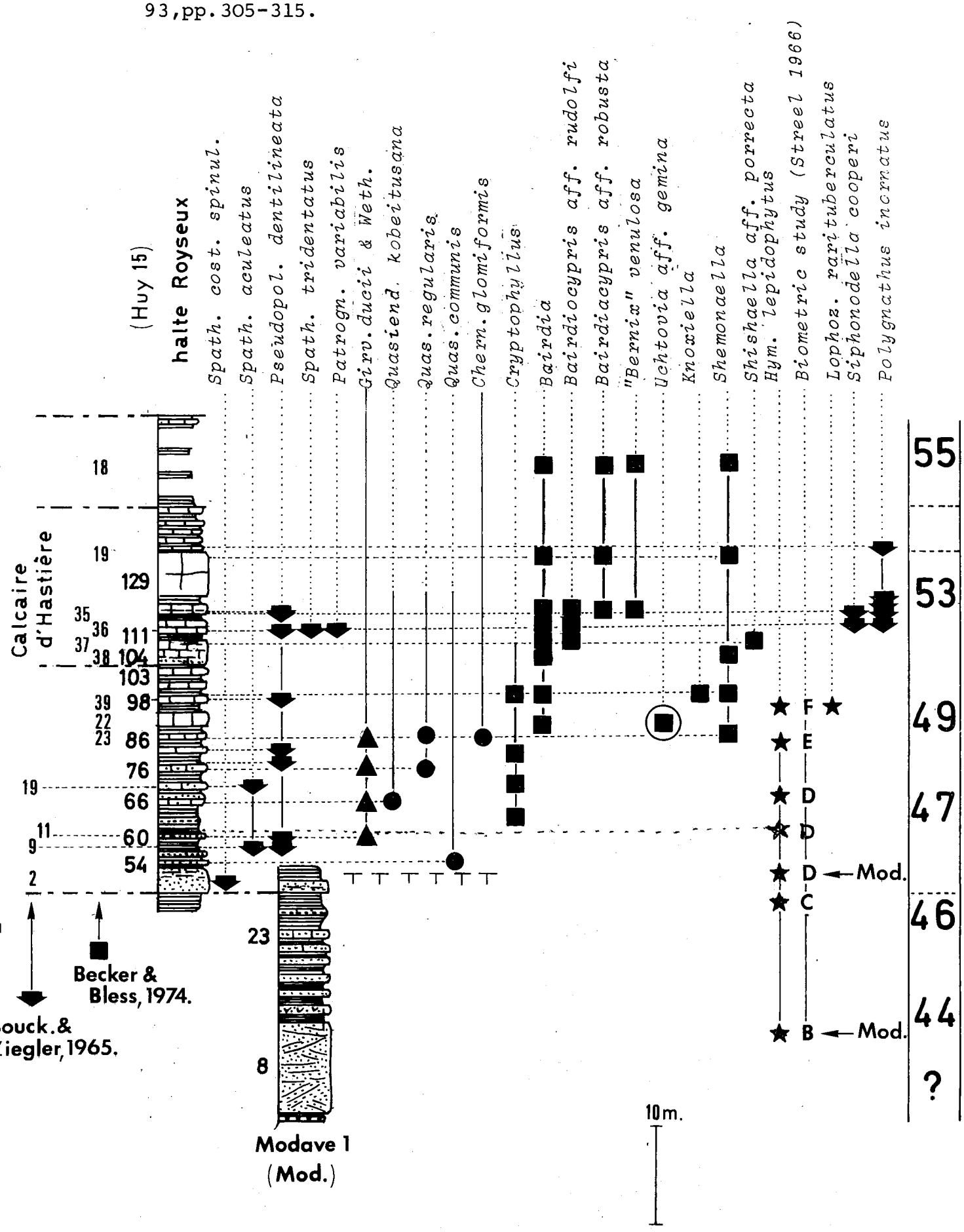
PROTOGNATHODUS

ERIC GROESSENS 1973

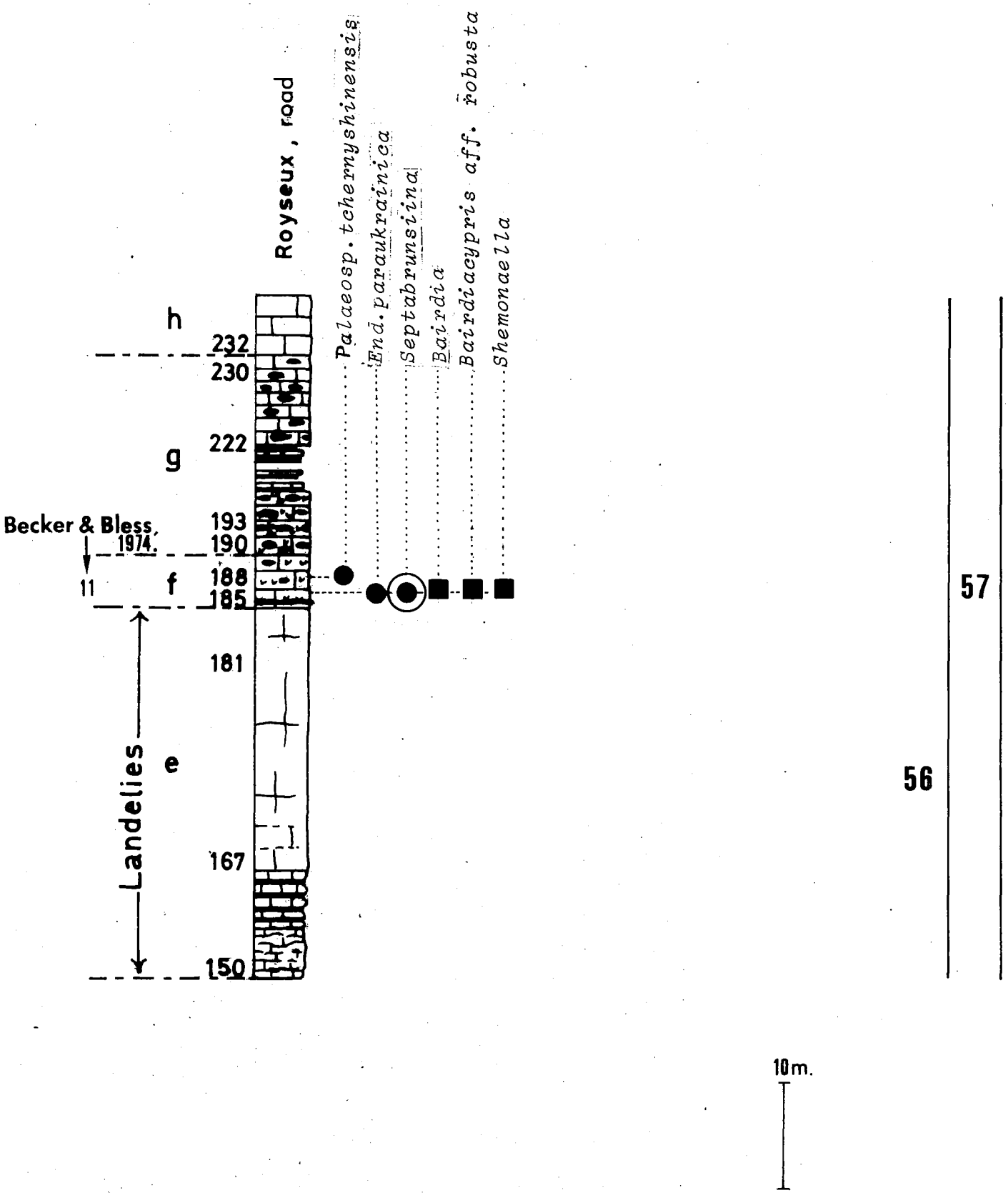
ROYSEUX C⑤a (M.g.m.44-55)

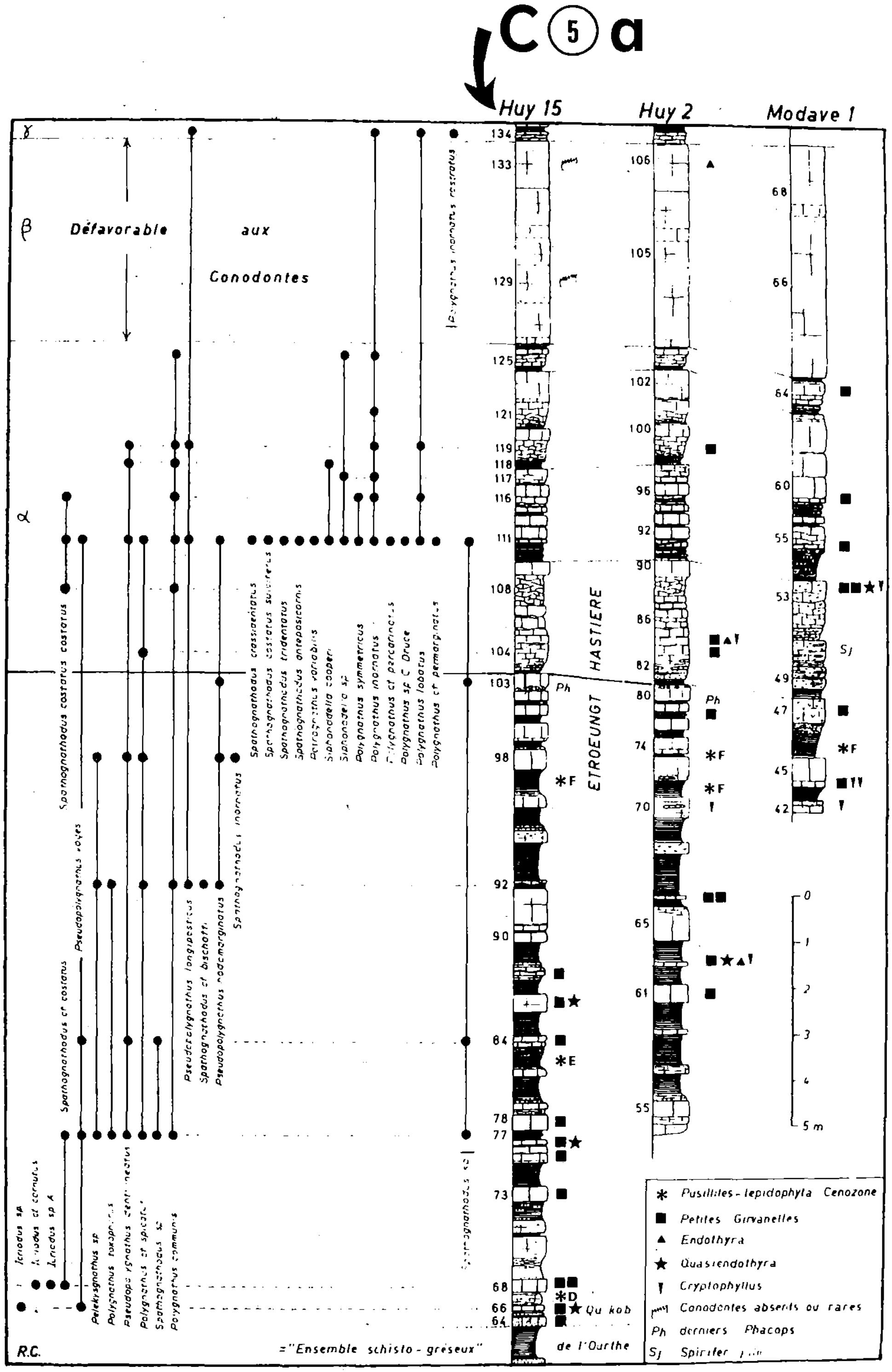
1964. R.CONIL, Acad.roy.Belg.,Cl.Sc.,Mém.4°,2,XV,4,pp.43-44,Pl.I.

1970. R.AUSTIN, R.CONIL, F.RHODES & M.STREEL, Ann.Soc.géol.Belg. 93,pp.305-315.



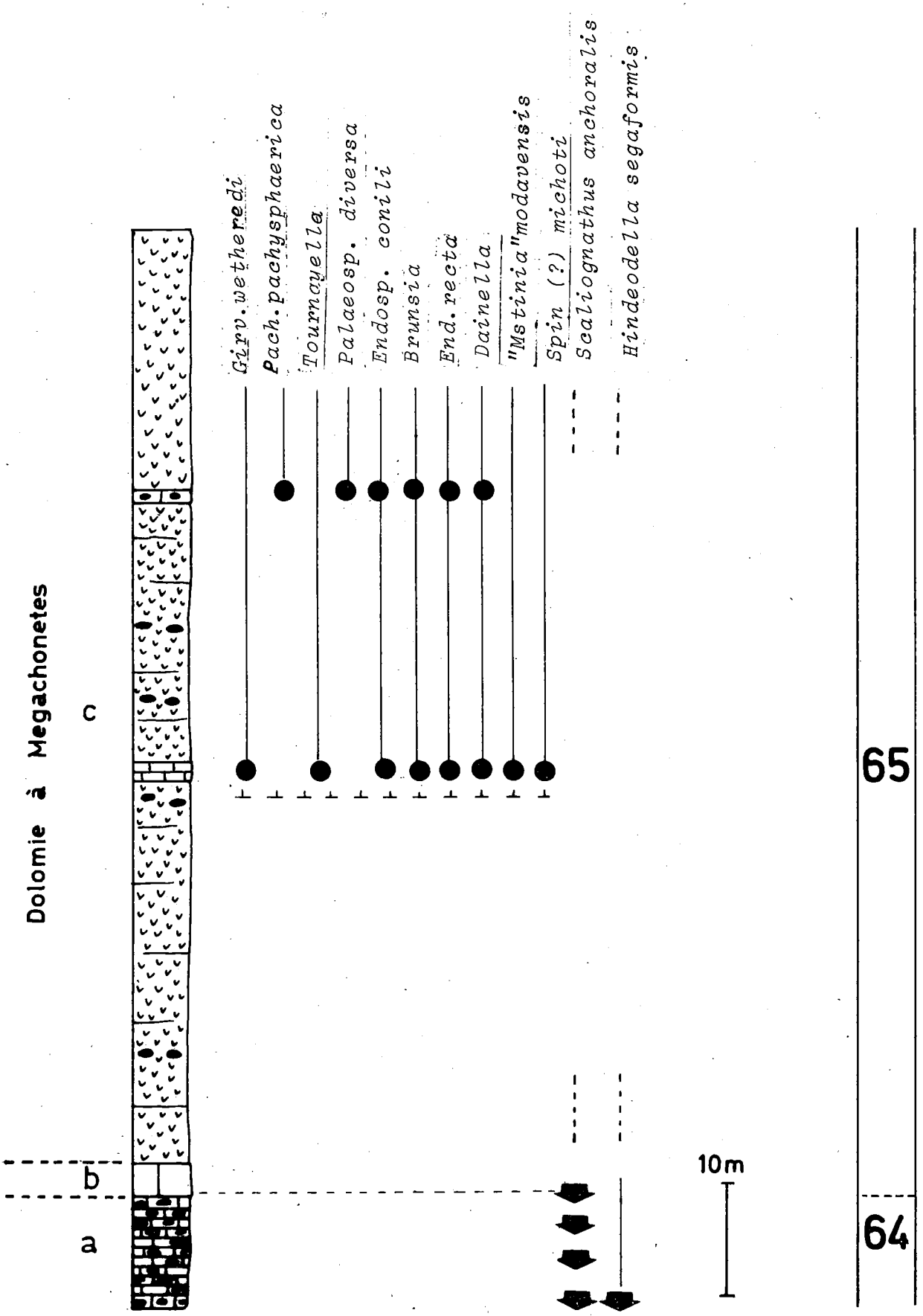
C⑤b (M.g.m.56-57)


Royseux, road
Palaeosp. tchernyshinensis
End. paraukrainica
Septabrunsiina
Bairdia
Bairdiacypris aff. robusta
Shemonaella
h
232
230
g
222
Becker & Bless, 1974.
193
190
11
f
188
185
181
Landelies
e
167
150
57
56
10m.


C ⑤ a
Huy 15
Huy 2
Modave 1
γ
β
α
Défavorable aux Conodontes
HASTIERE
ETROEUNGT
Ph
Sj
*F
*E
*D
Qu kob
R.C.
="Ensemble schisto - gréseux" de l'Ourthe
0
1
2
3
4
5 m
✱ Pusillites - lepidophyta Cenozone
■ Petites Girvanelles
▲ Endothyra
★ Quasiendothyra
Cryptophyllus
Conodontes absents ou rares
Ph derniers Phacops
Sj Spirifer

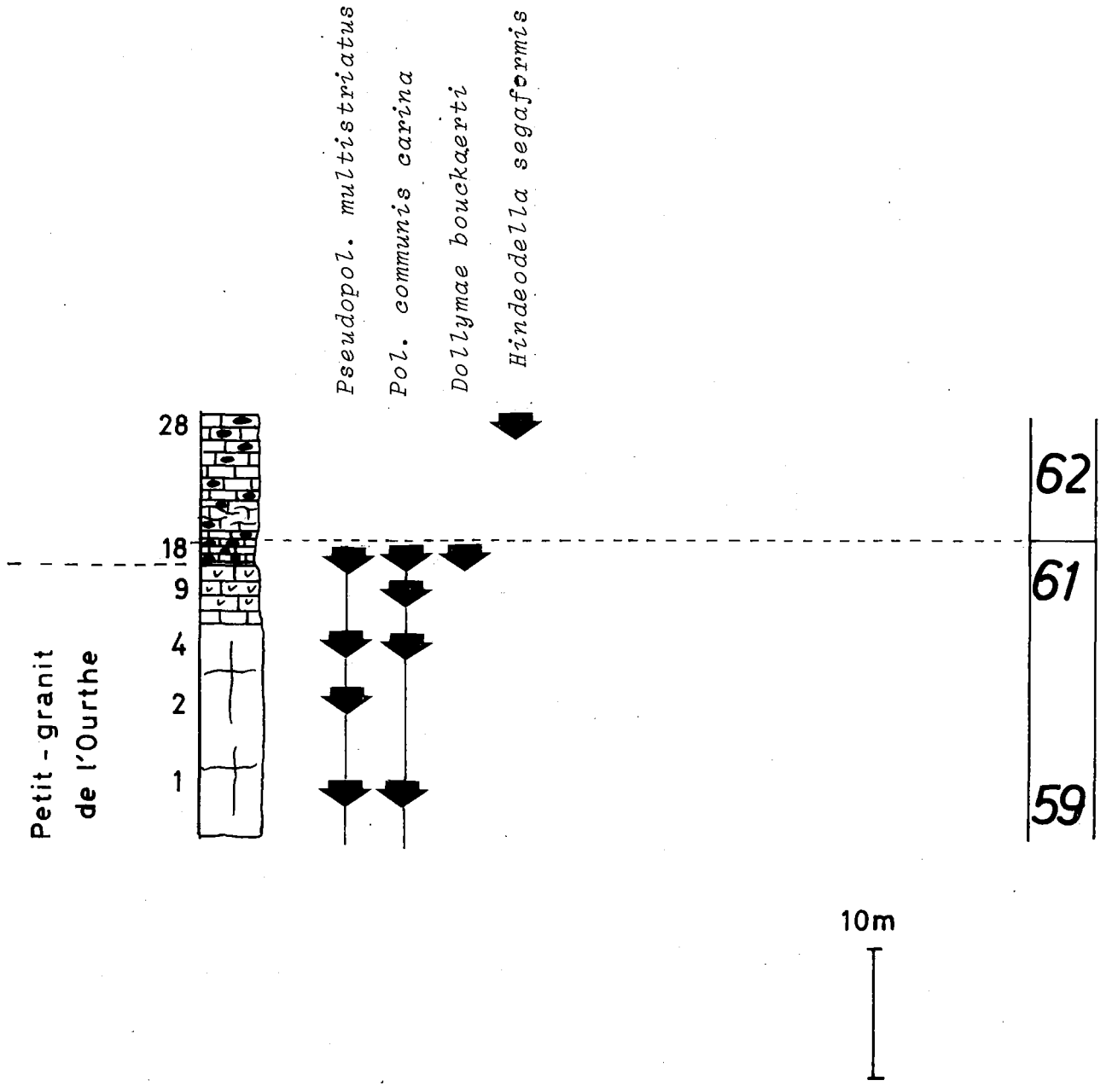
MODAVE C⑥ (M.g.m.64-65)

1967. R.CONIL, Ann.Soc.géol.Belg.,90,pp.419-420,fig.1.
1968. R.CONIL & M.LYS, Ann.Soc.géol.Belg.,91,p.497.



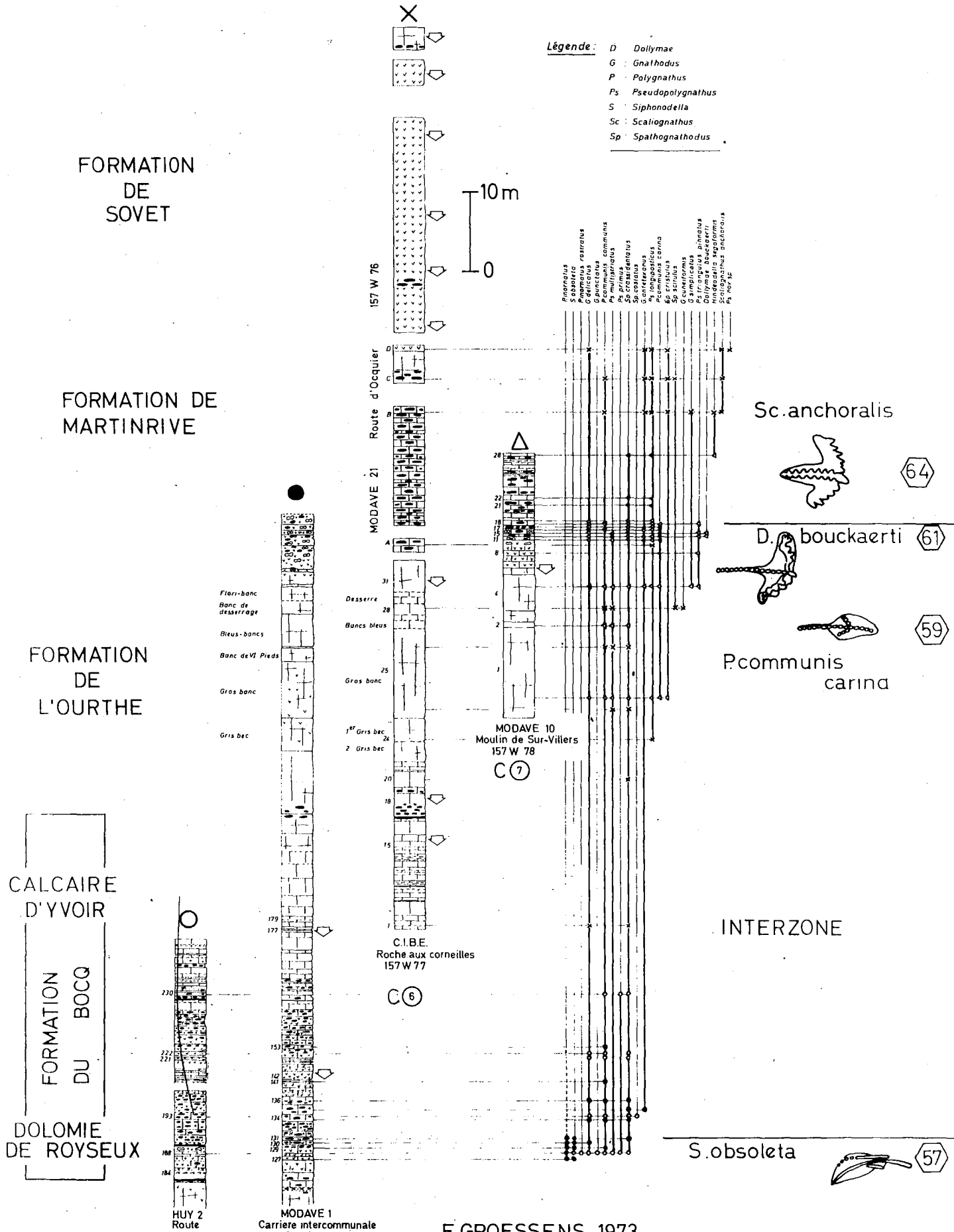
PETIT MODAVE C⑦ (M.g.m.59-62)

1967. R.CONIL, Ann.Soc.géol.Belg.,90,p.413.



VALLEE DU HOYOUX

Schéma bio. et lithostratigraphique du „Tournaisien supérieur"



E.GROESSENS 1973

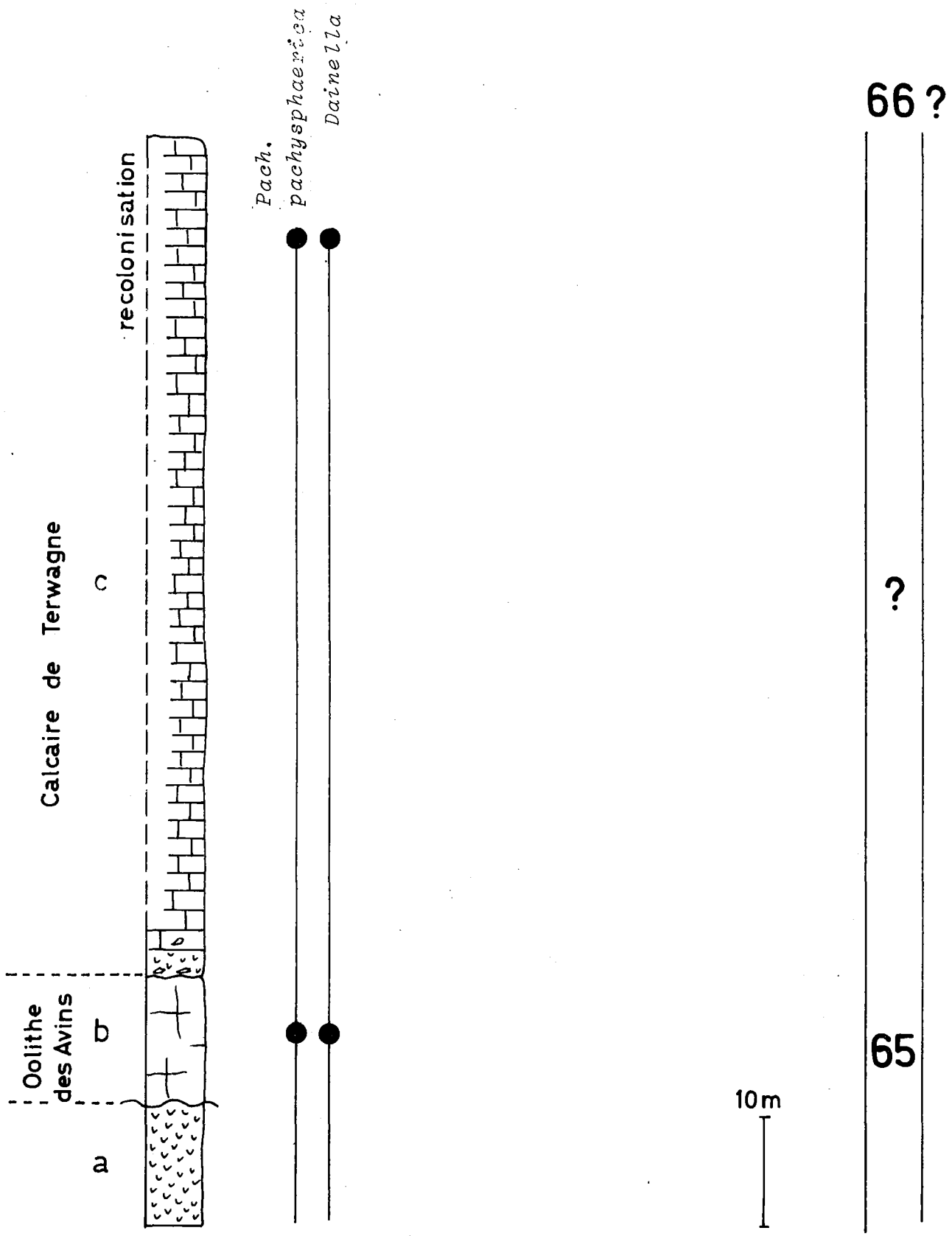
LES AVINS C⑧ (M.g.m.65)

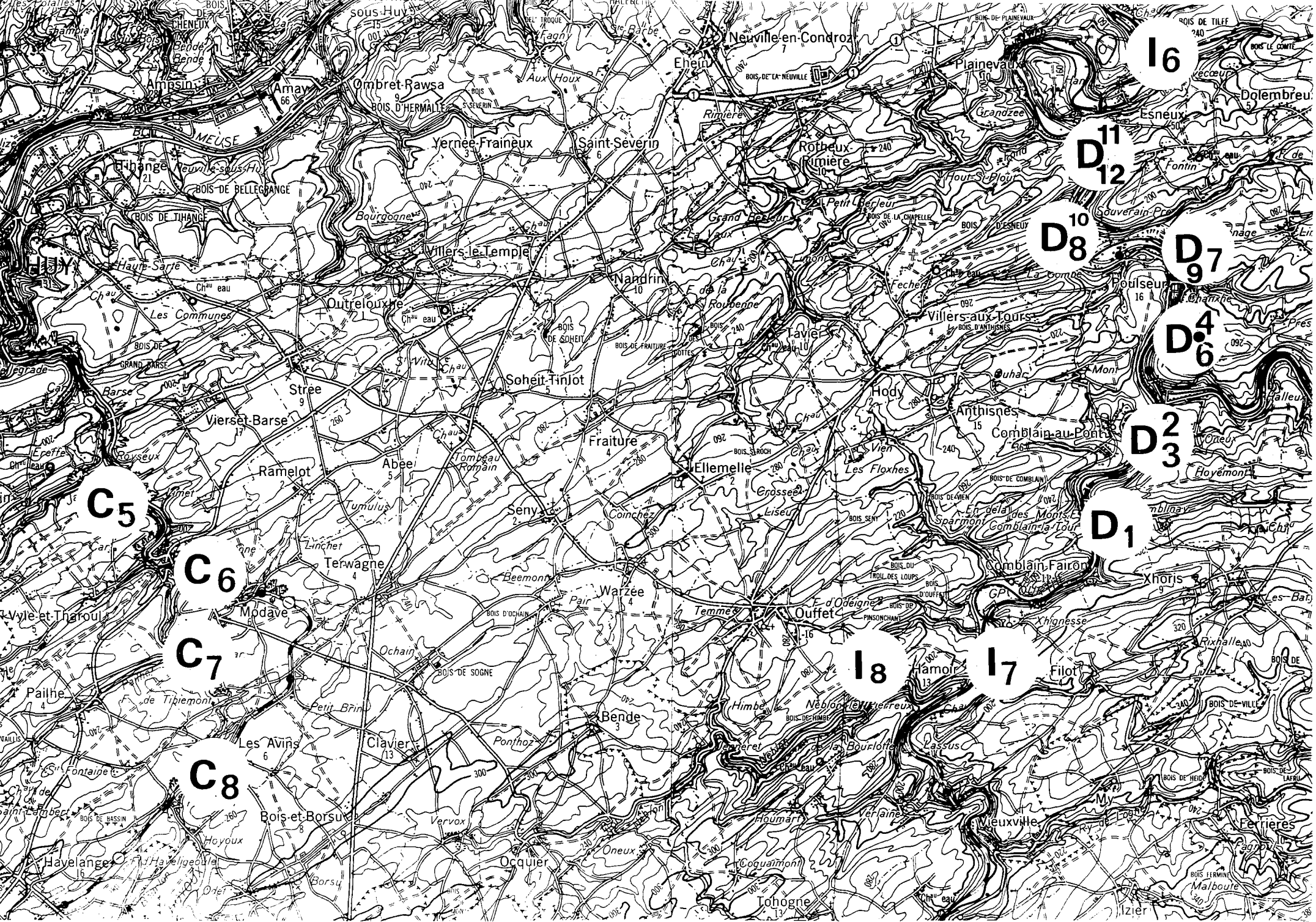
1967. R.CONIL, Ann.Soc.géol.Belg.,90,pp.419-420,fig.1.

1968. R.CONIL & M.LYS, Ann.Soc.géol.Belg.,91,p.497.

1971. J.BOUCKAERT, R.CONIL, A.DELMER et al., Prof.Paper Serv.géol.Belg.,n°2, p.28.

1973. R.MALPICA, Ann.Soc.géol.Belg.,96,p.227.

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Plainevaux
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Dolembreux
Ehein
Ampsin
Amay
Ombret-Rawsa
Yernée-Fraineux
Saint-Séverin
Rotheux-Rimière
Tihange
Neuville-sous-Huy
Villers-le-Temple
Nandrin
Outrelouxhe
Tavier
Villers-aux-Tours
Poulseur
Soheit-Tinlot
Strée
Vierset-Barse
Fraiture
Ellemelle
Hody
Anthisnes
Comblain-au-Pont
Hoyemont
Ramelot
Abée
Senye
Terwagne
Modave
Warzée
Ouffet
Comblain-Fairon
Xhoris
Vyle-et-Tharoul
Pailhe
Les Avins
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Filot
Bois-et-Borsu
Havelange
Ocquier
Tohogne
Izier
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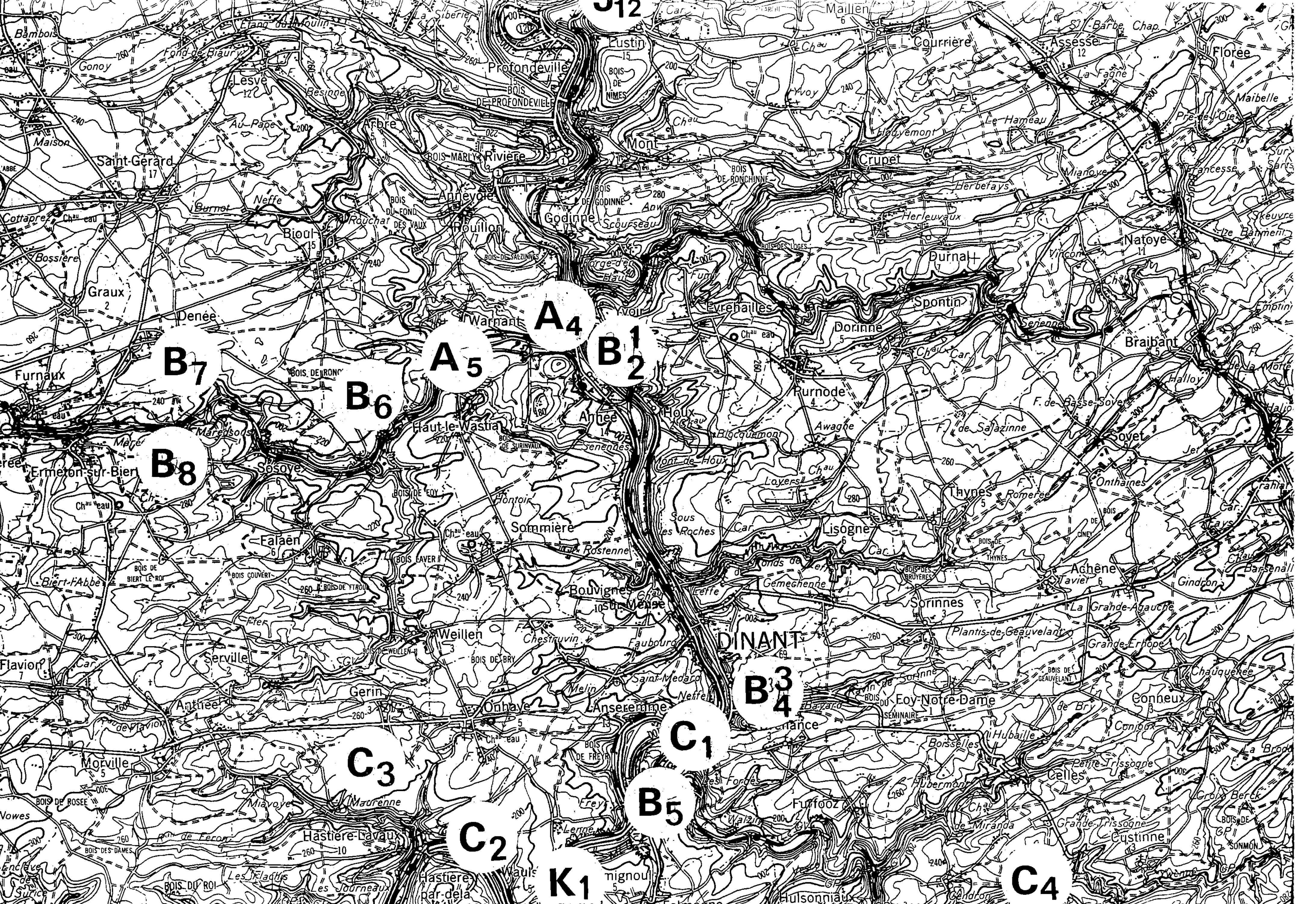
Ferrières



Profondeville
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Lesve
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Bioul
Natoye
Graux
Durnal
Denée
Warnant
Yvoir
Evrehailles
Spontin
Dorinne
Braibant
Furnaux
Purnode
Houx
Anhée
Haut-le-Wastia
Maredsous
Sosoye
Ermeton-sur-Biert
Sovet
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Lisogne
Falaën
Achêne
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Sorinnes
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Conneux
Morville
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Furfooz
Hastière-Lavaux
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MINISTRY OF ECONOMIC AFFAIRS
ADM. MINES - GEOLOGICAL SURVEY OF BELGIUM
13 Jennerstreet - 1040 Brussels - Belgium

INTERNATIONAL SYMPOSIUM ON

NAMUR 1974

BELGIAN MICROPALEONTOLOGICAL LIMITS

FROM EMSIAN TO VISEAN – SEPTEMBER 1st to 10th

EXCURSION D

Guides :

BLESS M.
BOUCKAERT J.
CONIL R.
DREESEN R.
GROESSENS E.
STREEL M.
THOREZ J. (leader)

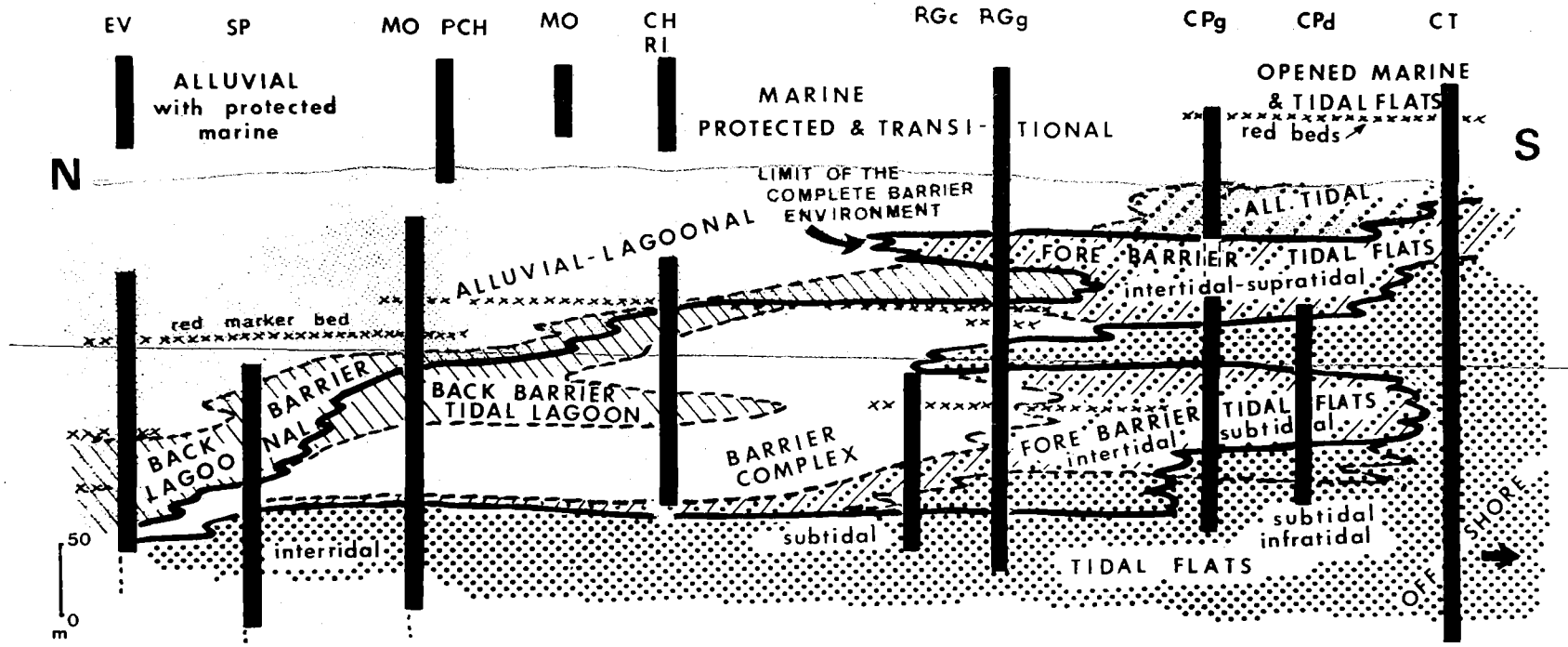
GUIDEBOOK

Edited by
J. BOUCKAERT & M. STREEL

The correlation chart (fig. 1) is taken from a previous work (B.S.T. 1968) but more recent and complementary data have been added and M.g.m used instead of chronozones for correlation. This chart presents the geographical and stratigraphical position of the different outcrops visited during excursion D and allows to built other diagrams. Fig. 2 for instance offers a simplified environmental reconstitution of the megafacies. Apart from a detailed analysis of the lithologics and rhythmic patterns and from the sedimentology, it has been possible to reconstruct the lithostratigraphical structure of the Ourthe valley Upper Famennian. Some formations and their associated members are shown on fig. 3. A complete proposal for a lithostratigraphical legend of the Upper Famennian in the north-eastern part of the Dinant synclinorium has been submitted to the Belgian National Commission on Devonian Stratigraphy but has not yet (June 1974) been discussed.

As shown by fig. 2 and 3, it must be emphasized that the "megaenvironments" are diachronous, particularly at the Montfort Fm. level. Sedimentology, palynology and micropaleontology (Forams, Conodonts and Ostracods) have been carried out independently and successively in the main outcrops.

Fig. 4, displays the acritarcha assemblages and Fig. 5, the Ostracods assemblages and their relationships with the lithological facies. The ostracods assemblages are tentatively situated in the sedimentary environment on Fig. 6 which summeries the paleotopography of a sedimentary sequence.



: the "Psammites du Condroz" (Upper Famennian) in the Ourthe Valley:

Fig. 2 simplified environmental reconstruction of the megafacies. The vertical black lines show the relative position of the investigated sections. No horizontal scale has been adopted. The sinuous black line borders the barrier complex s.l. with its ideal components back barrier, barrier complex s.s. and fore barrier.

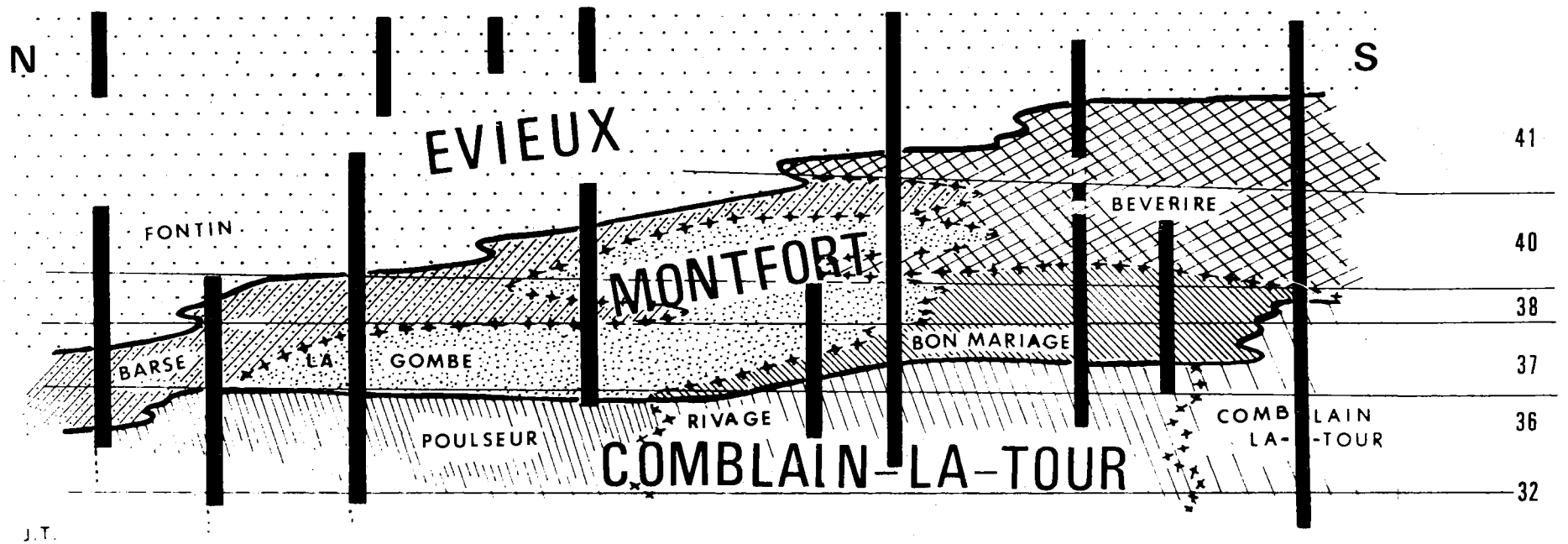


Fig.3 schematic distribution of the lithostratigraphic units (formations and members) in the same area. The interfingering pattern of these units has been largely simplified. The graph shows the Montfort Formation and parts of the Evieux and Comblain-la-Tour Formations

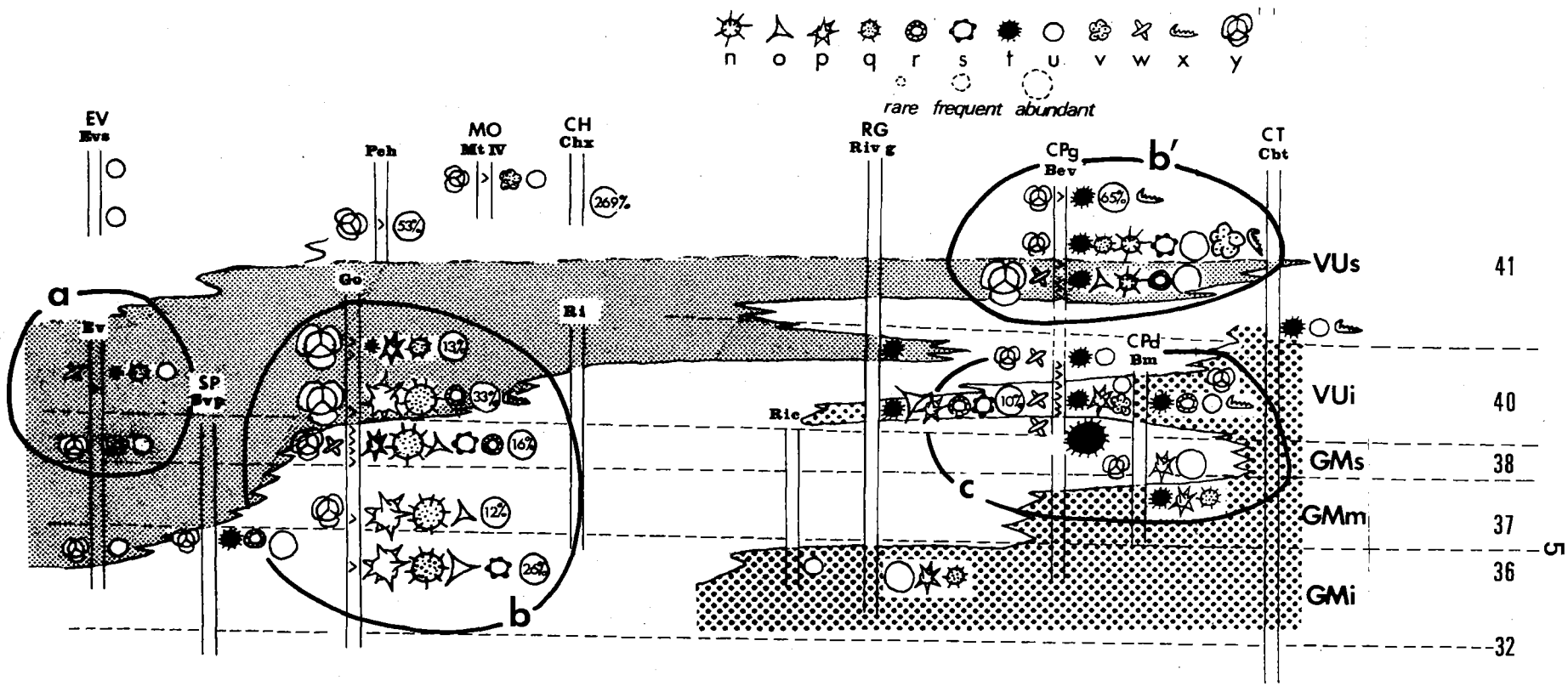


Fig.4 a, b, b', c : Acritarcha assemblages

n. Gorgonisphaeridium winslowii
o. Veryhachium trispinosum s.l.
p. Michrystridium cf. stellatum
q. Gorgonisphaeridium sp.
r. Cymatiosphaera
s. Tornacia sarjeanti
t. Lophosphaeridium
u. Leiospherids
v. Incertae sedis
w. Tracheids with grouped pits
x. Scolecodonts
y. Tetrads

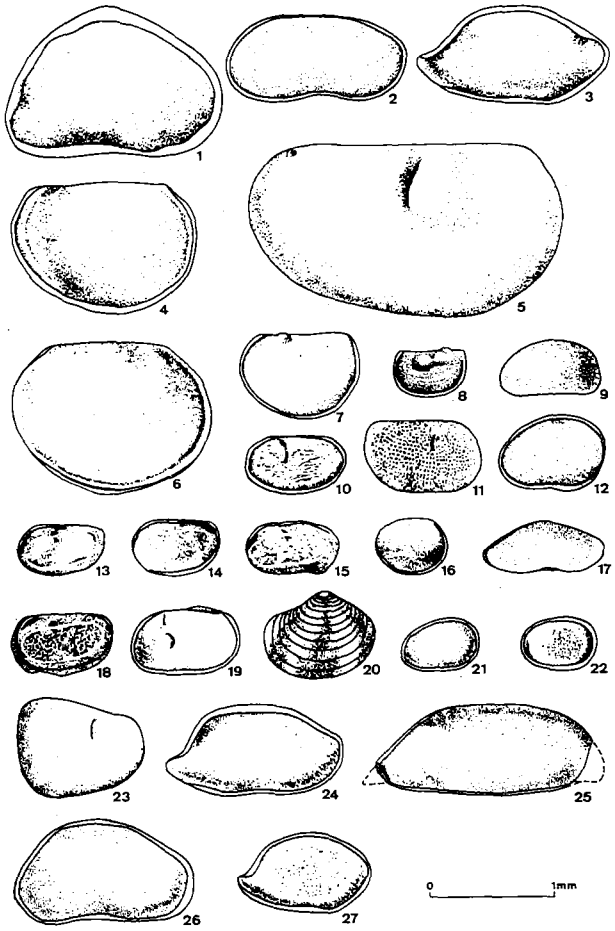
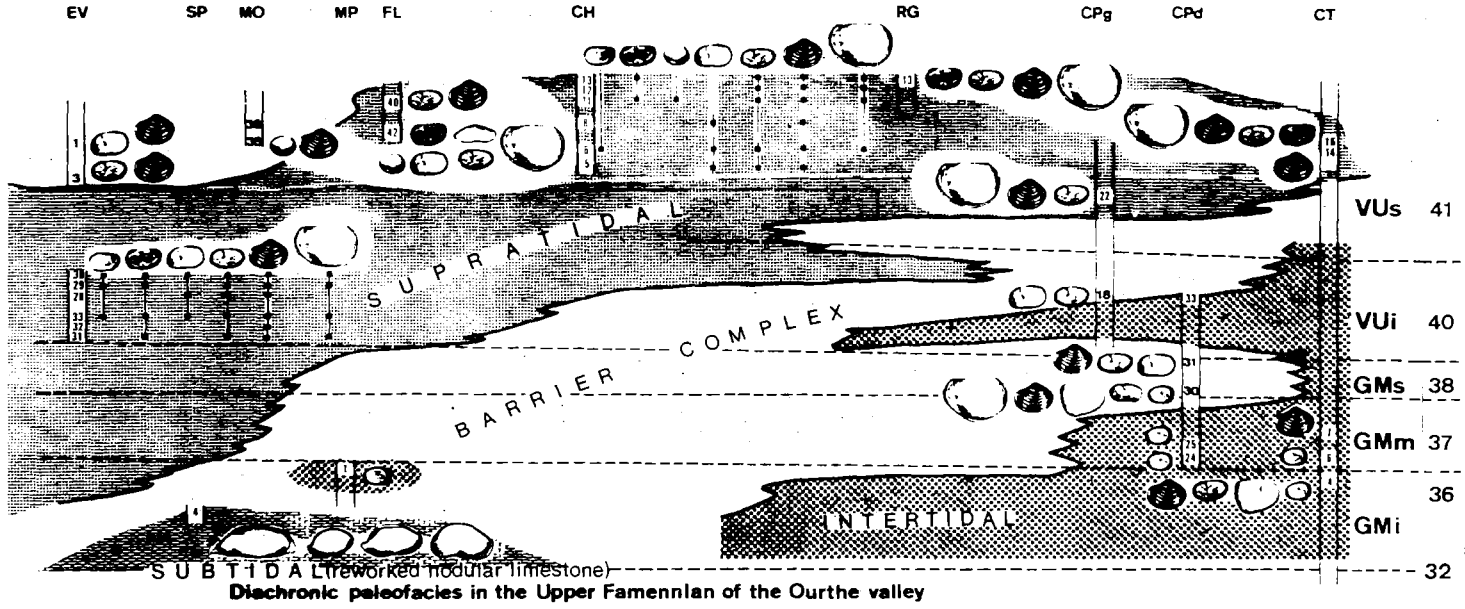


Fig.5



Diachronic paleofacies in the Upper Famennian of the Ourthe valley

1 = *Bairdiocypris* aff. *rudolphi* (KUMMEROW 1939); 2 = *Bairdiacypris* aff. *robusta* KUMMEROW 1939; 3 = *Bairdia* spp.; 4 = *Shemonaella* spp. 65 and 66; 5 = *"Bernix" venulosa* KUMMEROW 1939; 6 = *Shemonaella* ? sp. cf. 66; 7 = *Shishaella* aff. *porrecta* (ZANINA 1956); 8 = *Kellettina acutilobata* (ROME 1971); 9 = *Pseudobythocypris planoventralis* ROME 1971; 10 = *Knoxiella* spp.; 11 = *Knoxiella* cf. *complanata* (KUMMEROW 1939); 12 = *Cavellina coela* (ROME 1974); 13, 18 = *Beyrichiopsis glyptopleuroides* GREEN 1963; 14 = *Beyrichiopsis* sp. 47; 15 = *Beyrichiopsis* sp. 46; 16 = *Bouchekius* cf. *rotundus* ROZHDESTVENSKAJA 1972; 17 = *Bairdia* (*Cryptobairdia*) sp. 128; 19 = *Sulcella* sp. 44; 20 = *Cryptophyllus* spp.; 21 = *Cavellina* aff. *coela* (ROME 1974); 22 = *Cavellina* sp. 34; 23 = *Indivisia* aff. *variolata* ZANINA 1966; 24 = *Bairdia* aff. *povorinensis* SAMOILOVA 1970; 25 = *Acratia* cf. *evlanensis* EGOROV in POLENOVA 1953; 26 = *Bairdiocypris* sp. 32; 27 = *Bairdia* aff. *kelleri* EGOROV in POLENOVA 1953

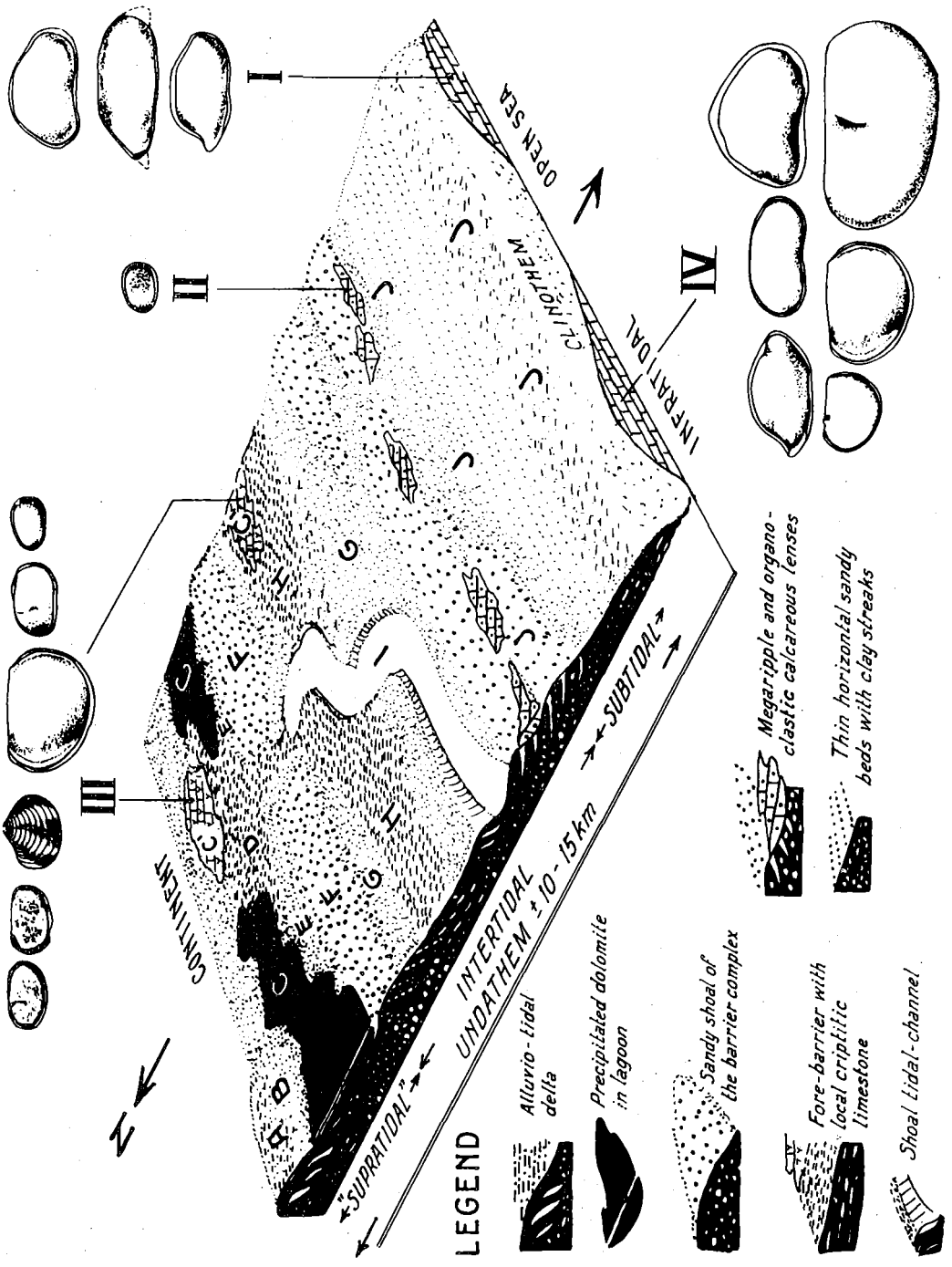
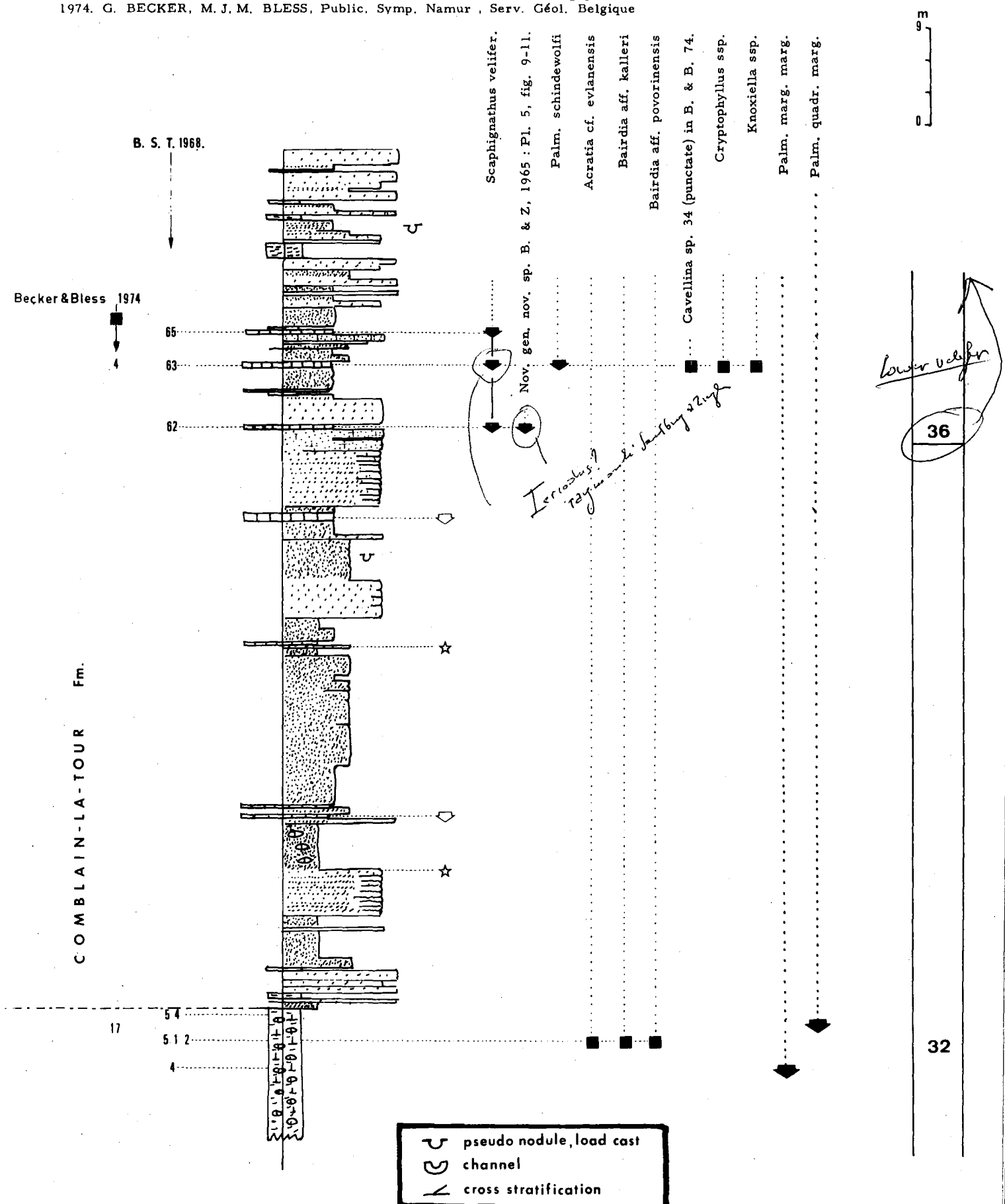


Fig.6 Reconstruction of the paleogeography of a sedimentary sequence

COMBLAIN-LA-TOUR

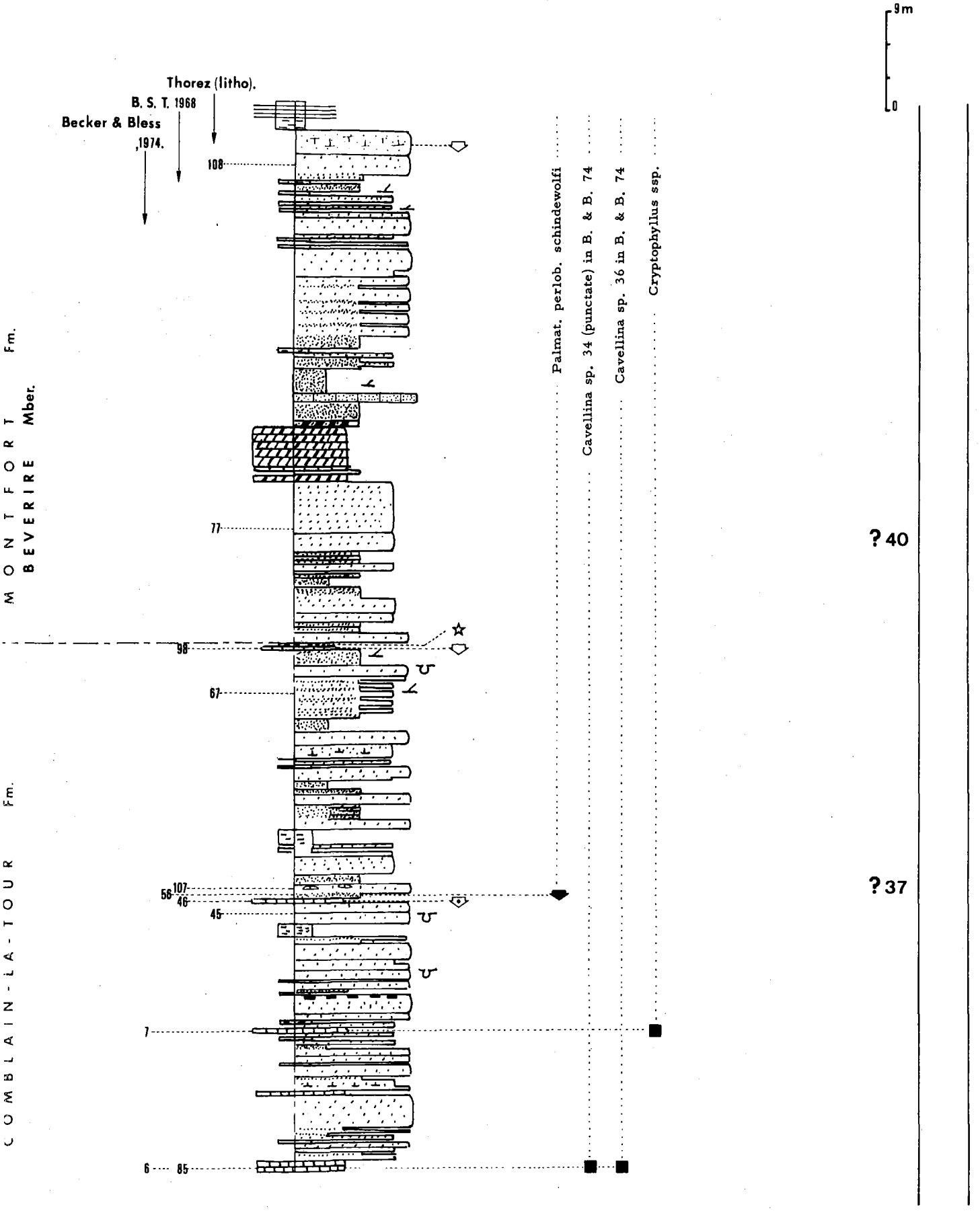
D ① a (Mgm 32-36)

1965. J. BOUCKAERT, W. ZIEGLER & J. THOREZ, Mém. Expl. Cartes Géolog. et Min. Belgique, 5 : Esneux 177
1968. J. BOUCKAERT, M. STREEL & J. THOREZ, Ann. Soc. Géol. Belgique, 91 : hors-texte I
1974. G. BECKER, M. J. M. BLESS, Public. Symp. Namur , Serv. Géol. Belgique



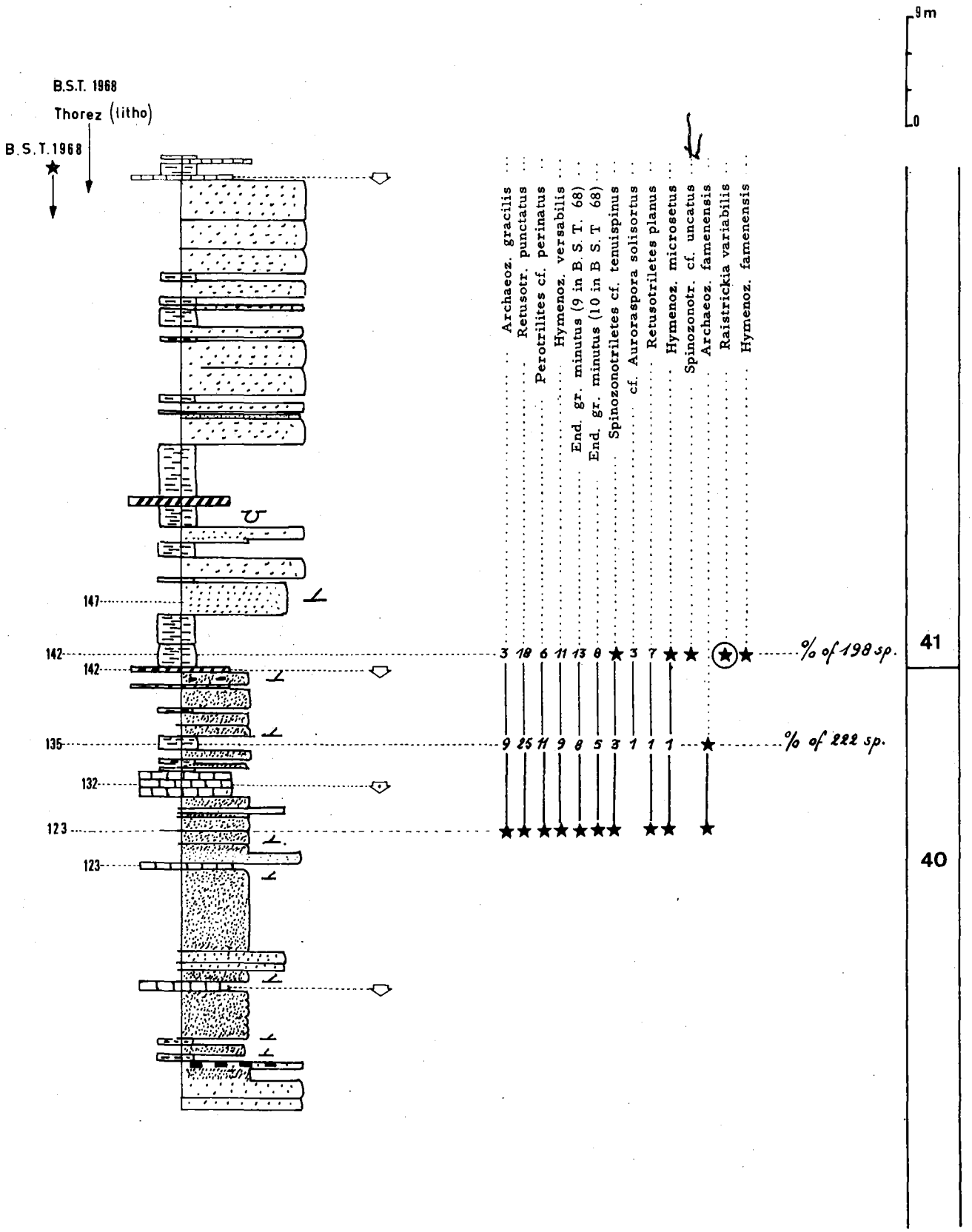
COMBLAIN-LA-TOUR

D①b (Mgm 37-40)



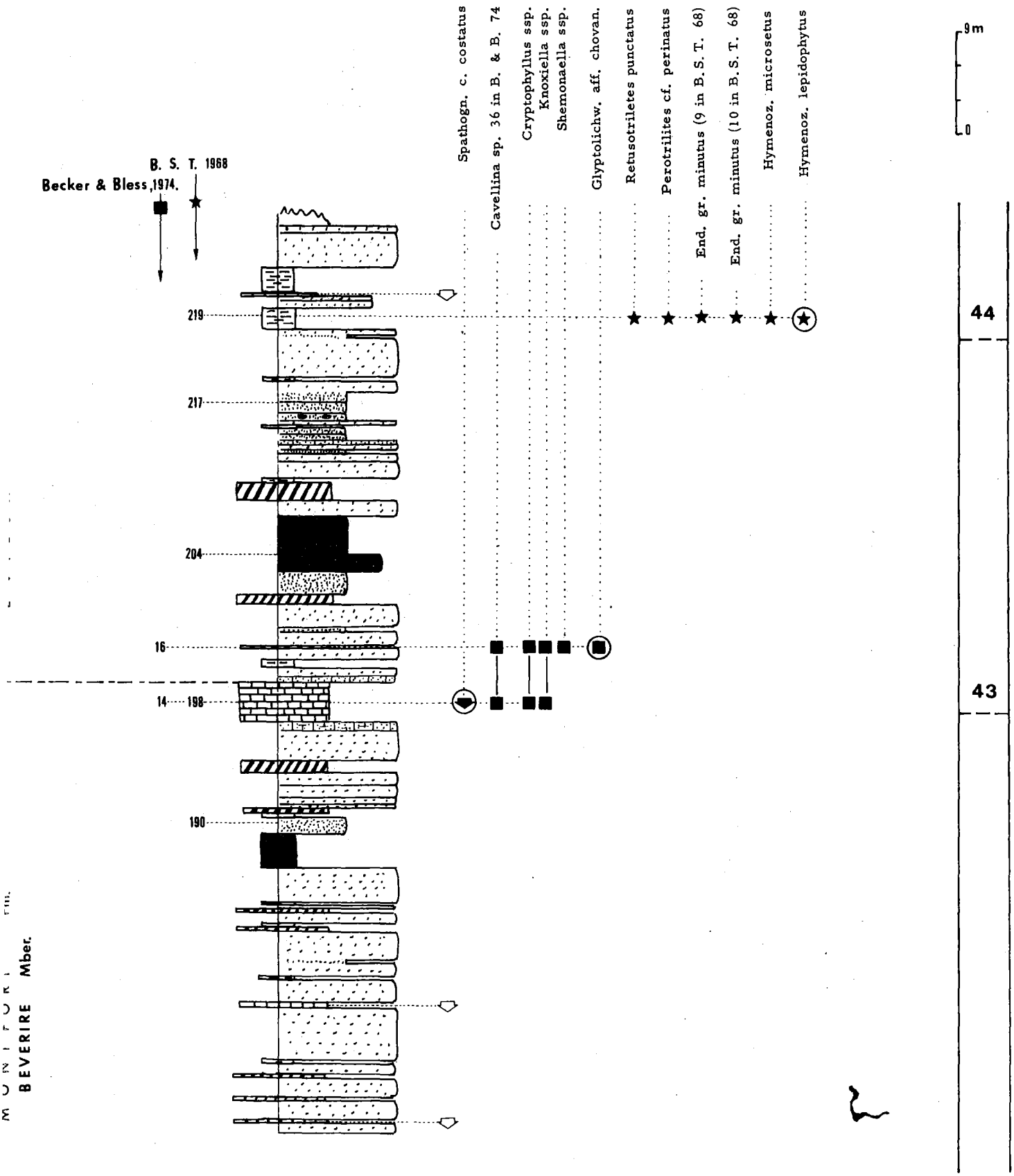
COMBLAIN-LA-TOUR

D ① c (Mgm 40-41)



COMBLAIN-LA-TOUR

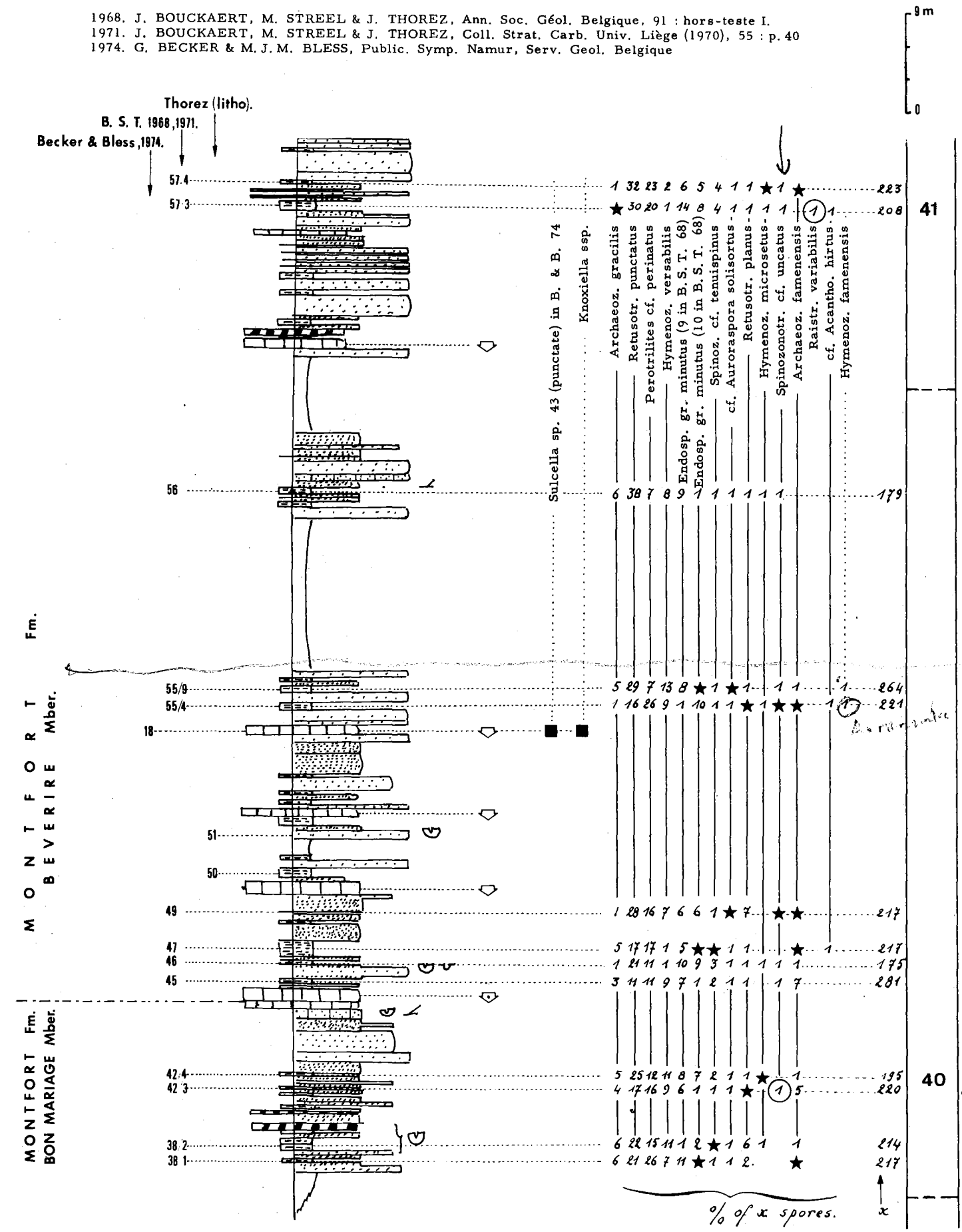
D ① d Mgm (43-44)



COMBLAIN-AU-PONT — Left bank
"BEVERIRE"

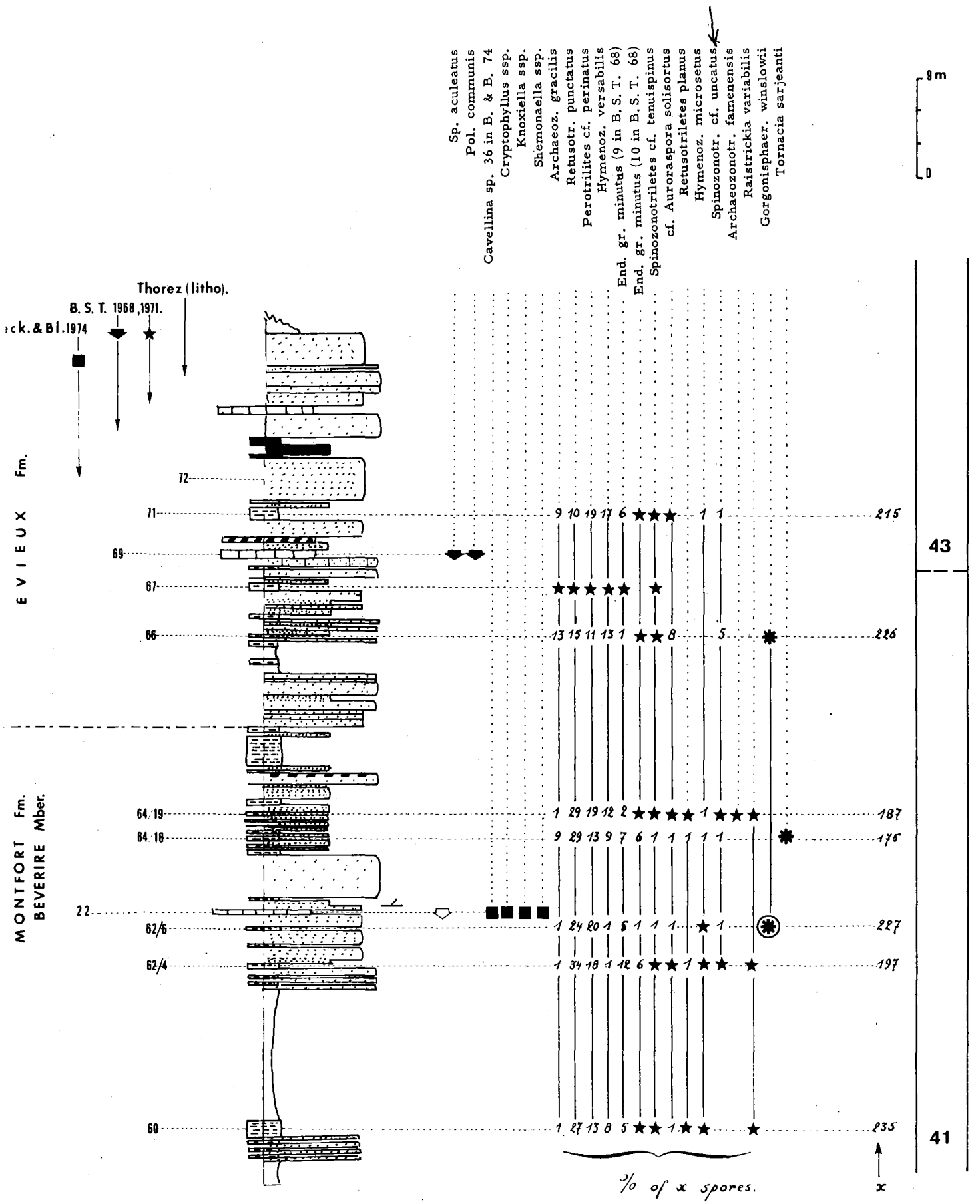
D②a (Mgm 40-41)

1968. J. BOUCKAERT, M. STREEL & J. THOREZ, Ann. Soc. Géol. Belgique, 91 : hors-teste I.
1971. J. BOUCKAERT, M. STREEL & J. THOREZ, Coll. Strat. Carb. Univ. Liège (1970), 55 : p. 40
1974. G. BECKER & M. J. M. BLESS, Public. Symp. Namur, Serv. Geol. Belgique



COMBLAIN-AU-PONT — Left bank
"BEVERIRE"

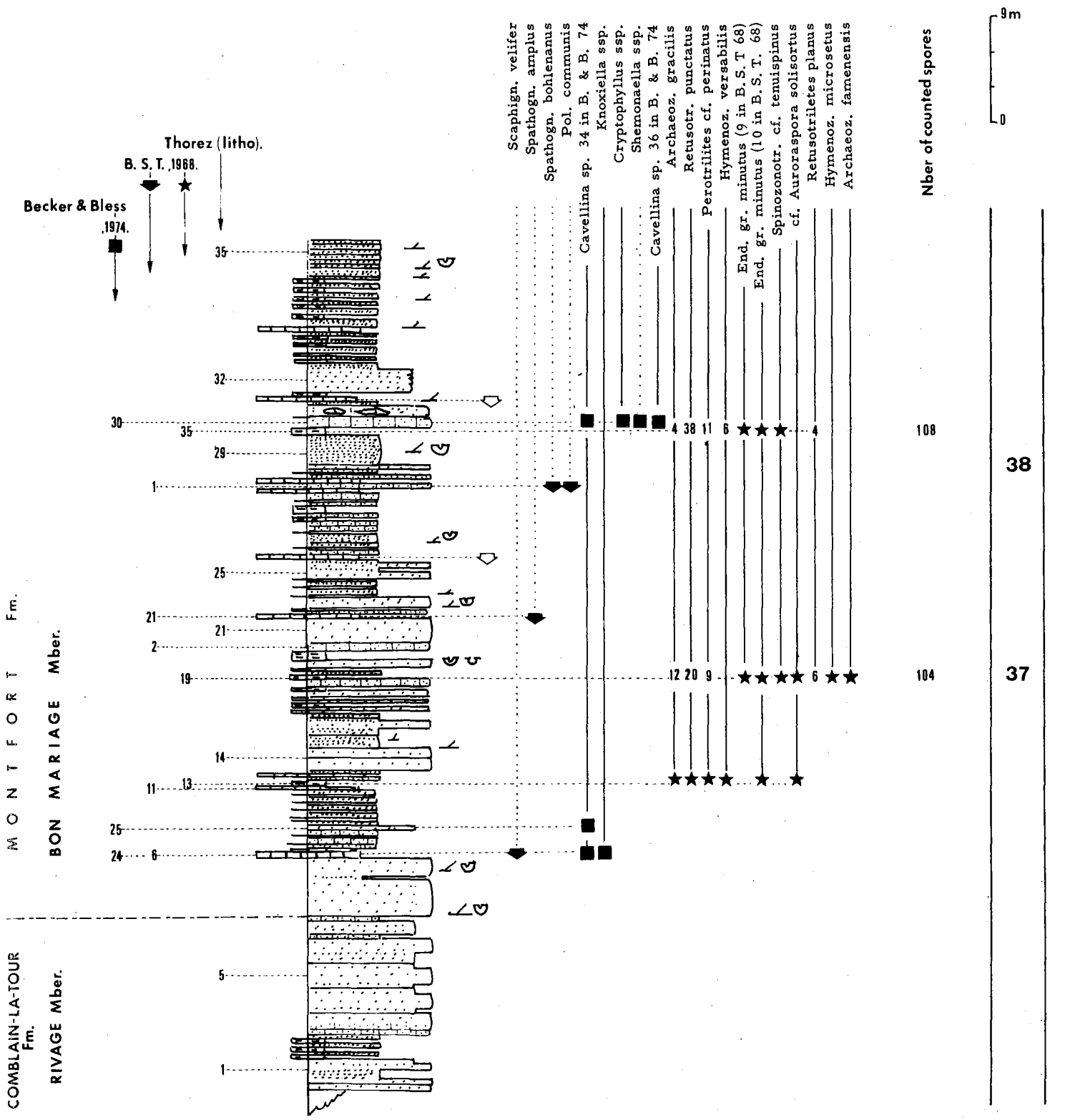
D②b (Mgm 41-43)



COMBLAIN-AU-PONT— Right bank "BON MARIAGE"

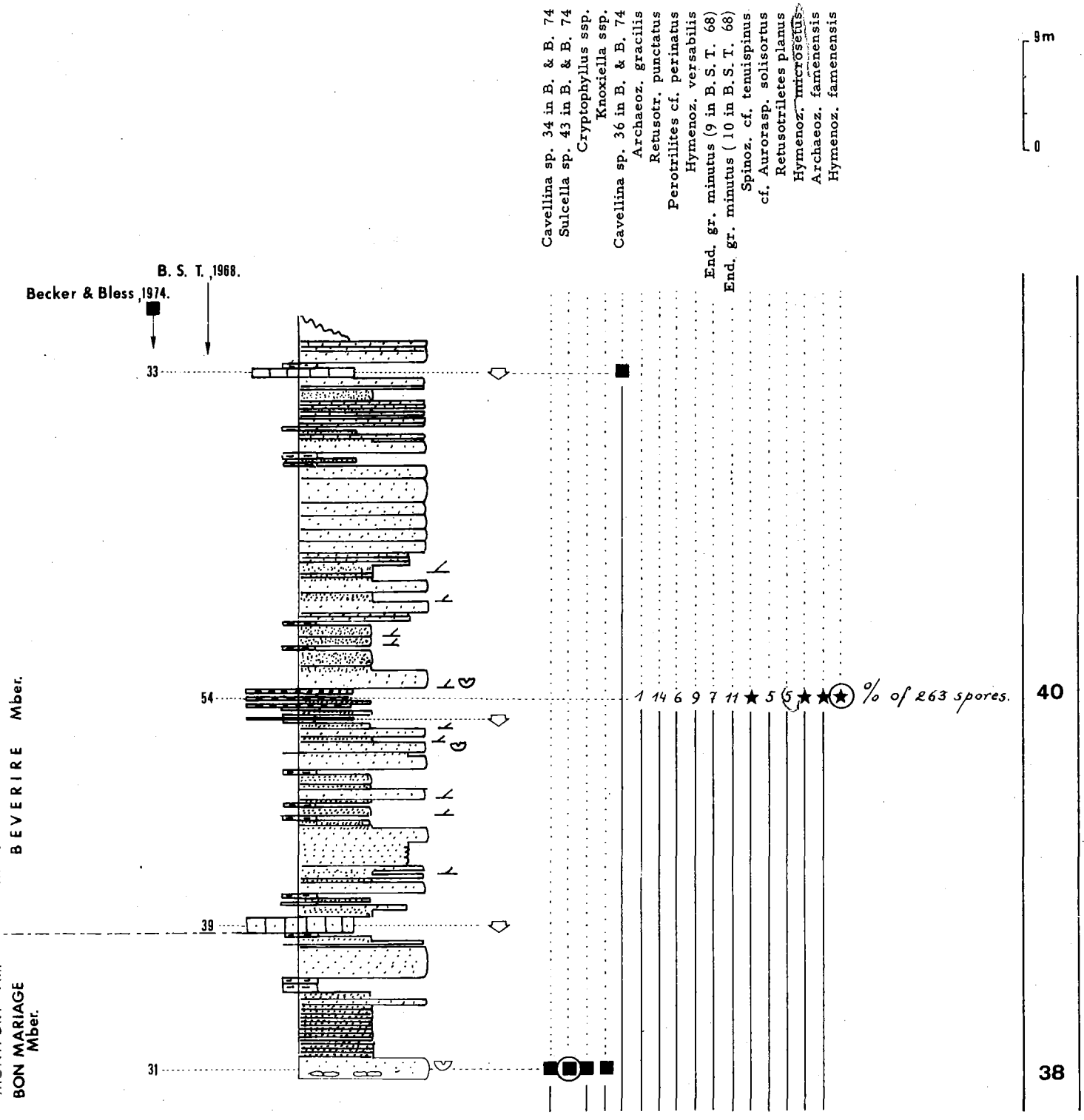
D③a (Mgm 37-38)

1968. J. BOUCKAERT, M. STREEL & J. THOREZ, Ann. Soc. Geol. Belgique, 91 : hors-texte I.
1974. G. BECKER & M. J. M. BLESS. Public. Symp. Namur : Serv. Geol. Belgique



COMBLAIN-AU-PONT — Right bank
"BON MARIAGE"

D③b (Mgm 38-40)



RIVAGE GARE

D ④ a (Mgm 33-37)

1964. R. CONIL, Mém. Acad. Roy. Belg., Cl. Sc., Mém. 4°, 2, XV, 4, pp. 46-50, pls. IV-XI
1965. B. MAMET. G. MORTELMANS & P. SARTENAER, Bull. Soc. belge Géol., LXXIV ; fig. 2. IV
1966. M. STREEL, Ann. Soc. Géol. Belgique, 89, 3, p. 65, h. t. II
1967. L. FRANSSEN, Ann. Soc. Géol. Belgique, 90, pp. 571-580, h. t.
1968. M. STREEL, C. R. 6è congr. carb. Sheffield, 1, pp. 3-18
1968. J. BOUCKAERT, M. STREEL, J. THOREZ, Ann. Soc. Géol. Belgique, 91 h. t. I.
1970. R. CONIL & J. M. GRAULICH, Prof. Paper. Serv. Geol., n° 4, pls 11 12.
1970. D. WEYER, Bull. Soc. belgégéol., 79, p. 65.
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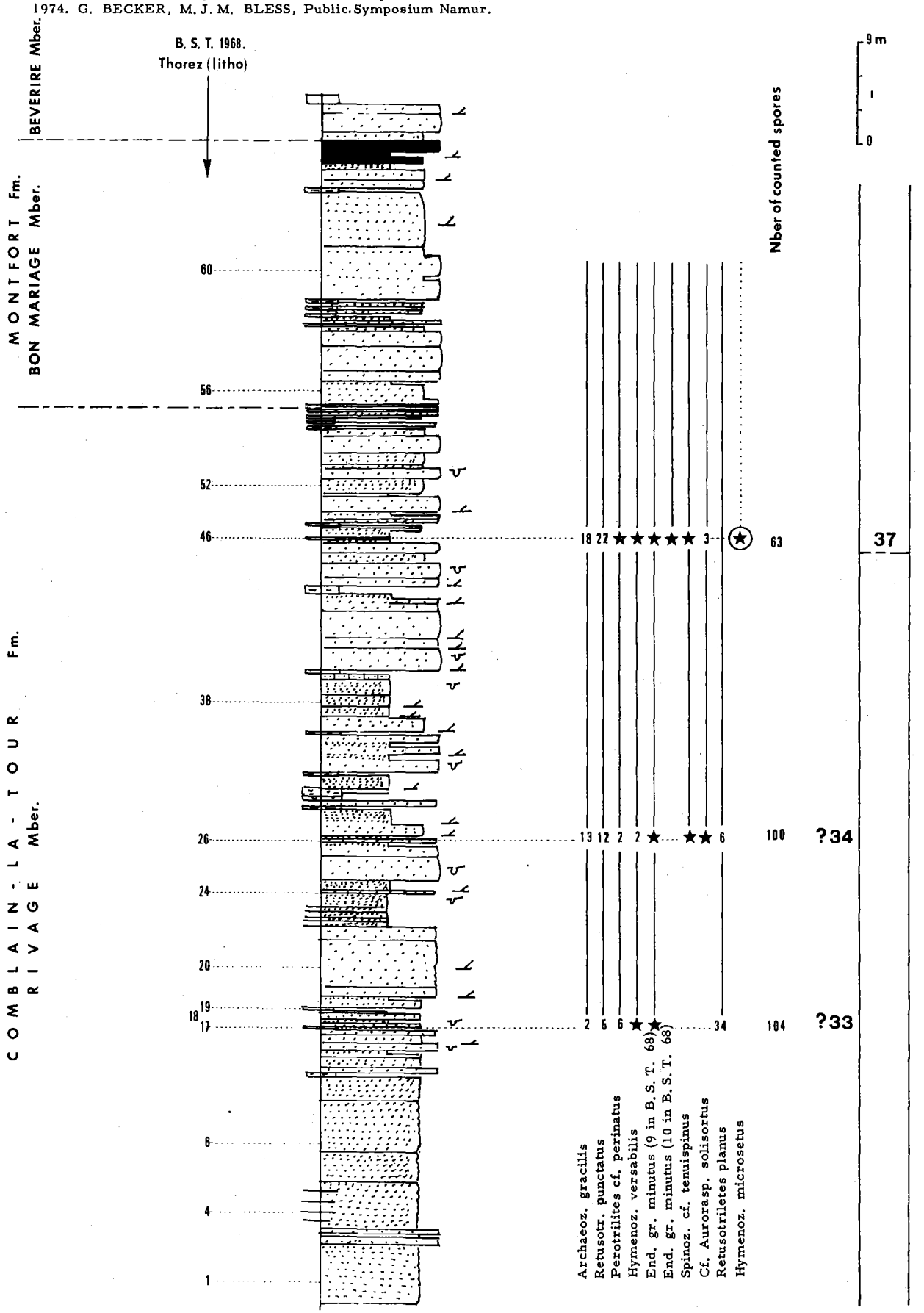
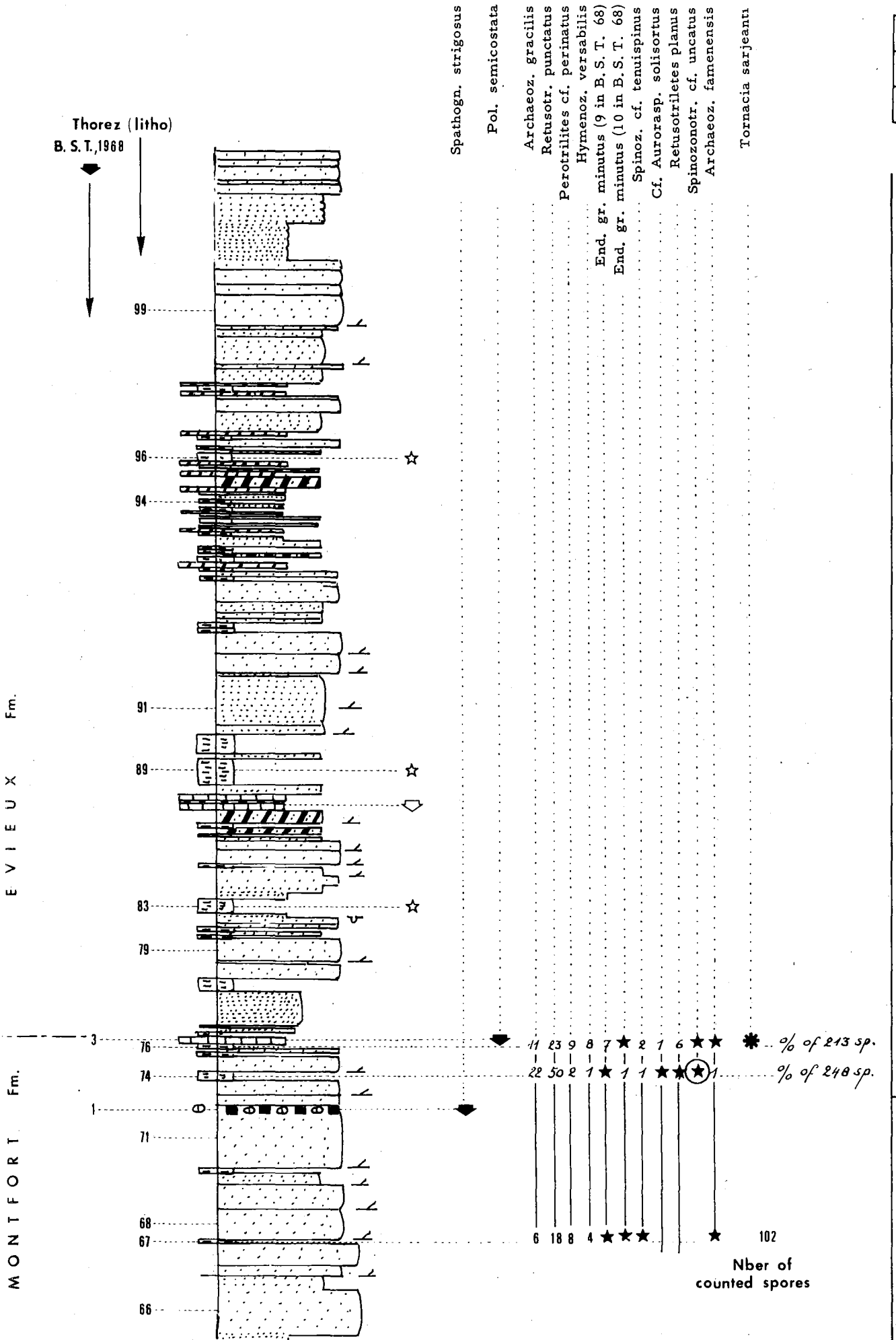
1970. J. BOUCKAERT, M. STREEL & J. THOREZ, Coll. Strat. Carb. Liège, p. 45.
1971. J. BOUCKAERT, R. CONIL, A. DELMER, E. GROESSENS, G. MORTELMANS, H. PIRLET, M. STREEL, J. THOREZ, Prof. Paper, Serv. Géol., n°2, p. 6.
1974. G. BECKER, M. J. M. BLESS, Public. Symposium Namur.



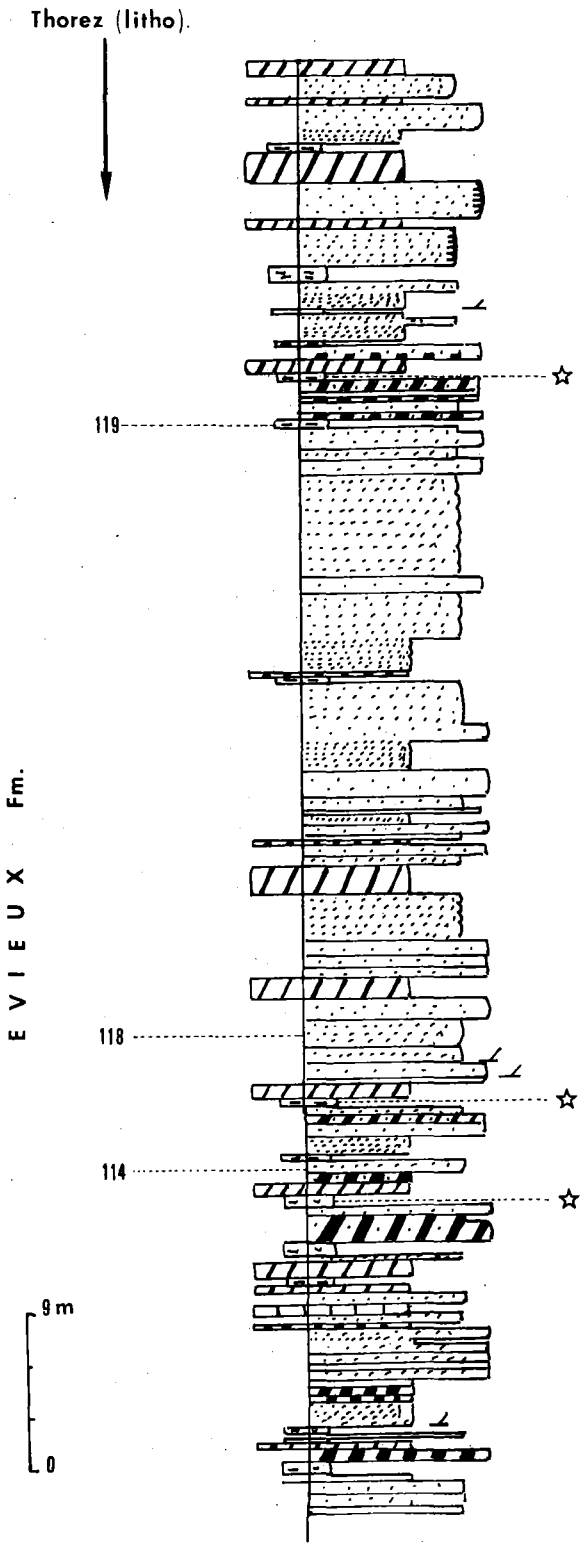
RIVAGE GARE

D④b (Mgm 40)



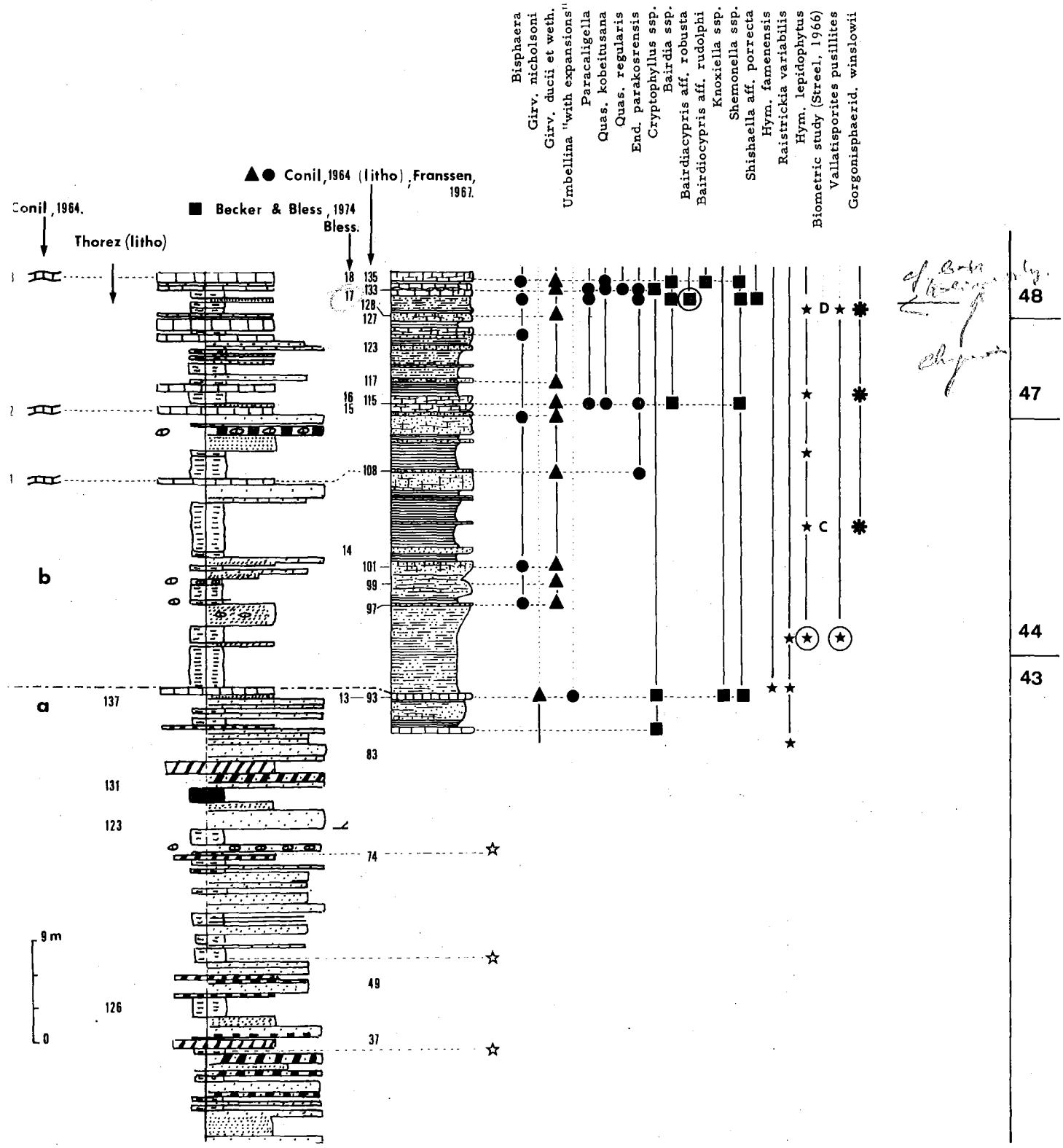
RIVAGE GARE

D ④ c



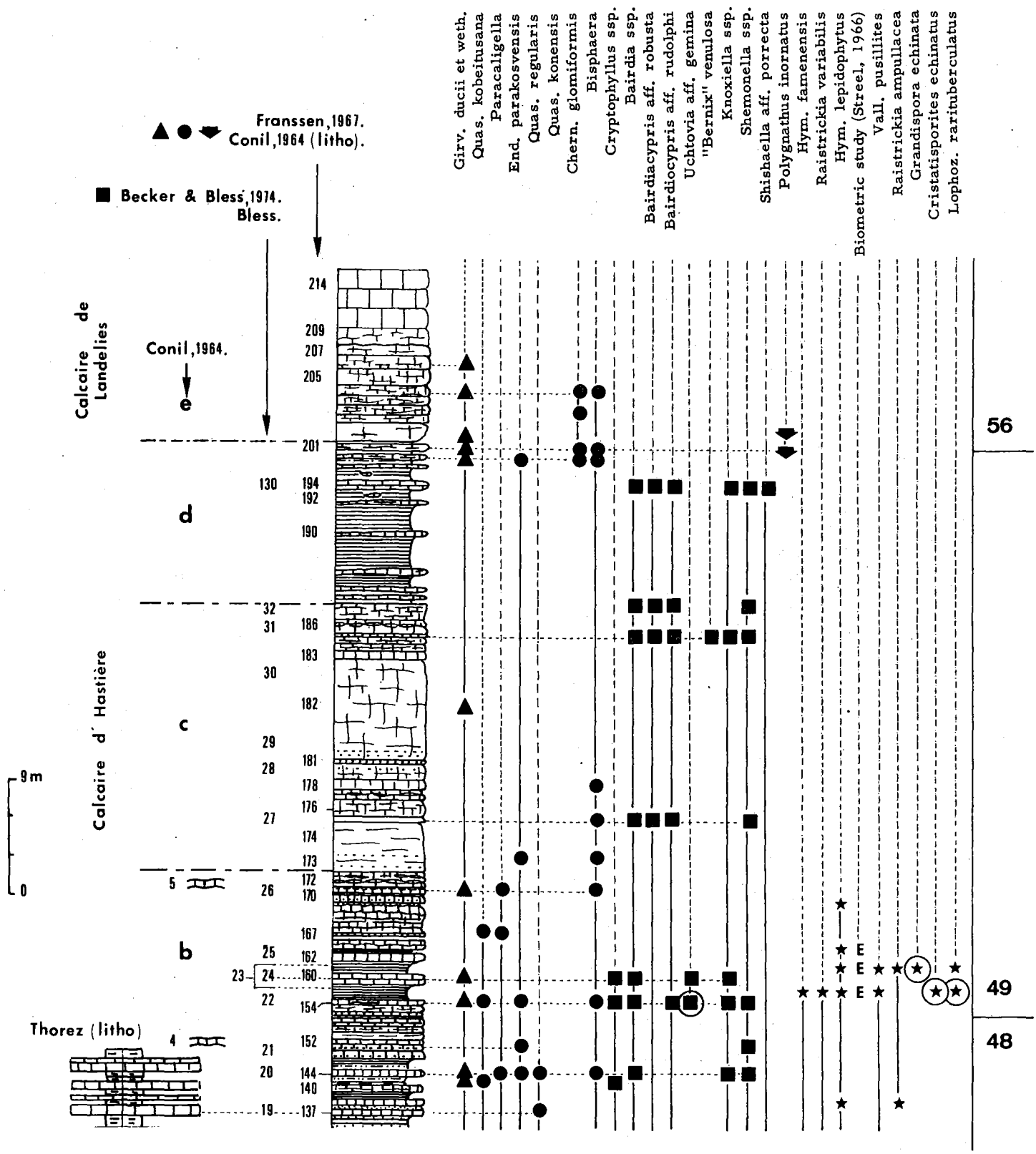
RIVAGE GARE

D ① d (M g m 43-48)

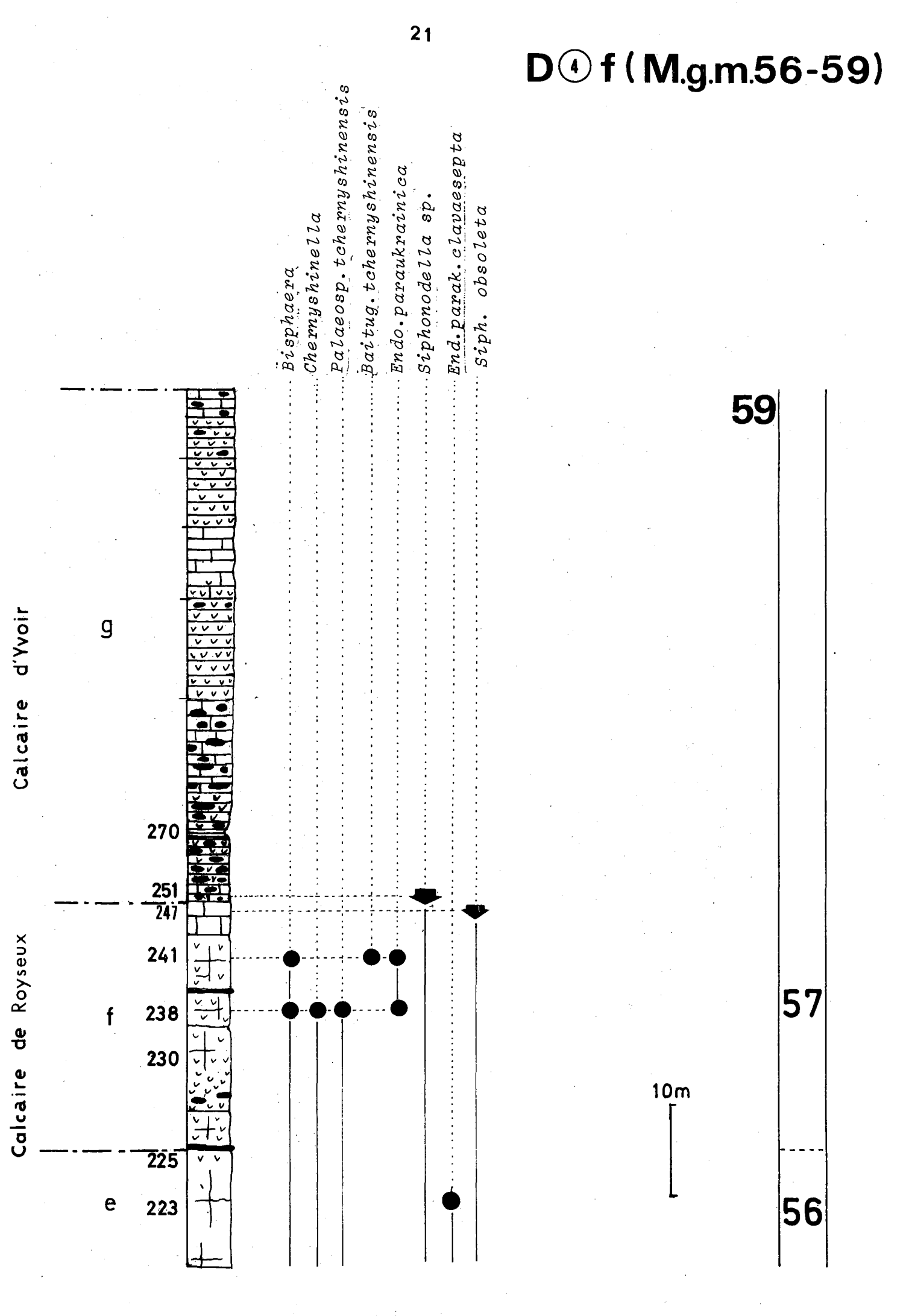


RIVAGE GARE

D ④ e (M g m 48-56)



D④f (M.g.m.56-59)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Palaeosp. tchernyshinensis
Baitug. tchernyshinensis
Endo. parauktainica
Siphonodella sp.
End. parak. clavaesepta
Siph. obsoleta
Calcaire d'Yvoir
Calcaire de Royseux
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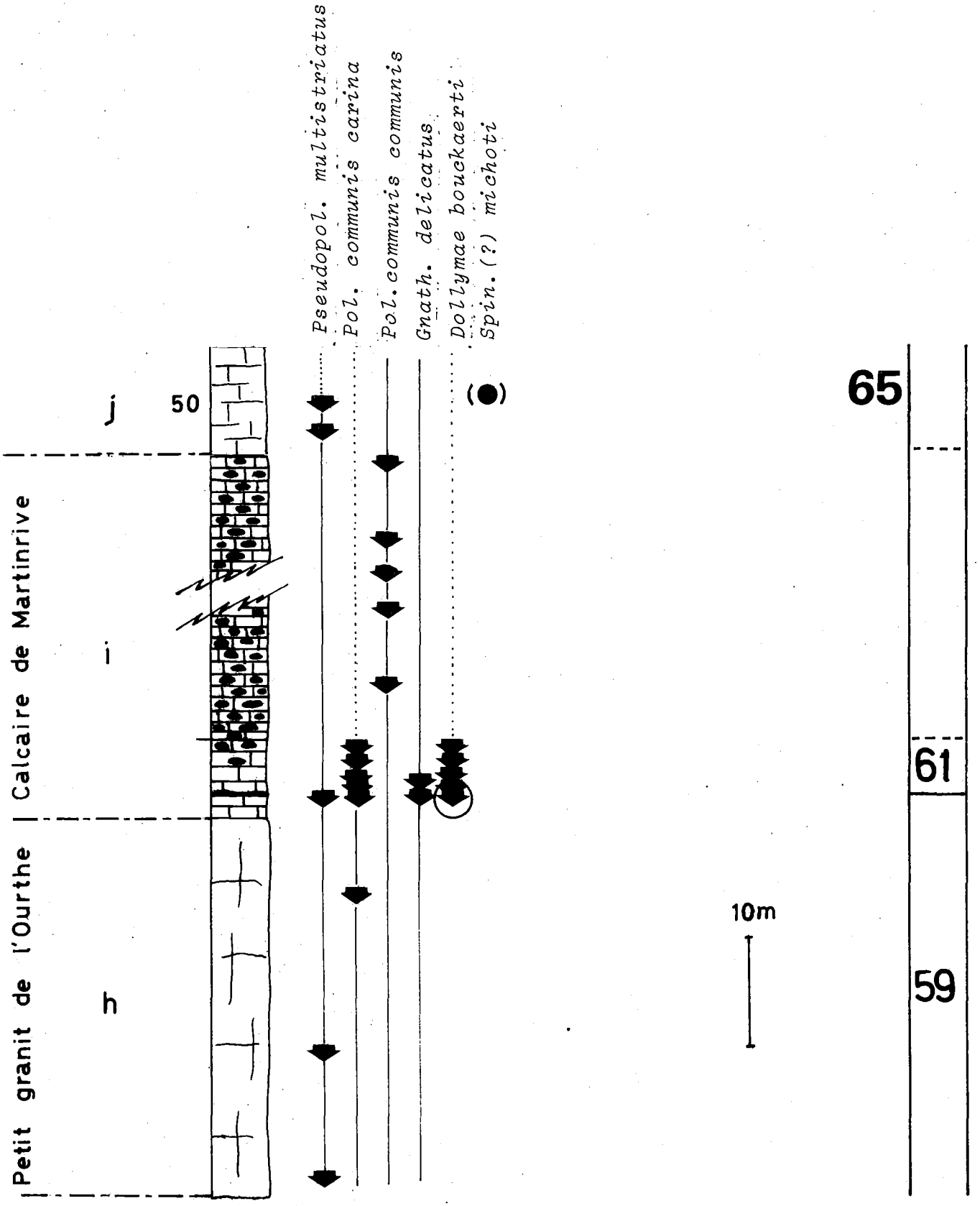
D④g (M.g.m. 60-65)


Pseudopol. multistriatus
Pol. communis carina
Pol. communis communis
Gnath. delicatus
Dollymae bouckaerti
Spin. (?) michoti
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Calcaire de Martinrive
Petit granit de l'Ourthe
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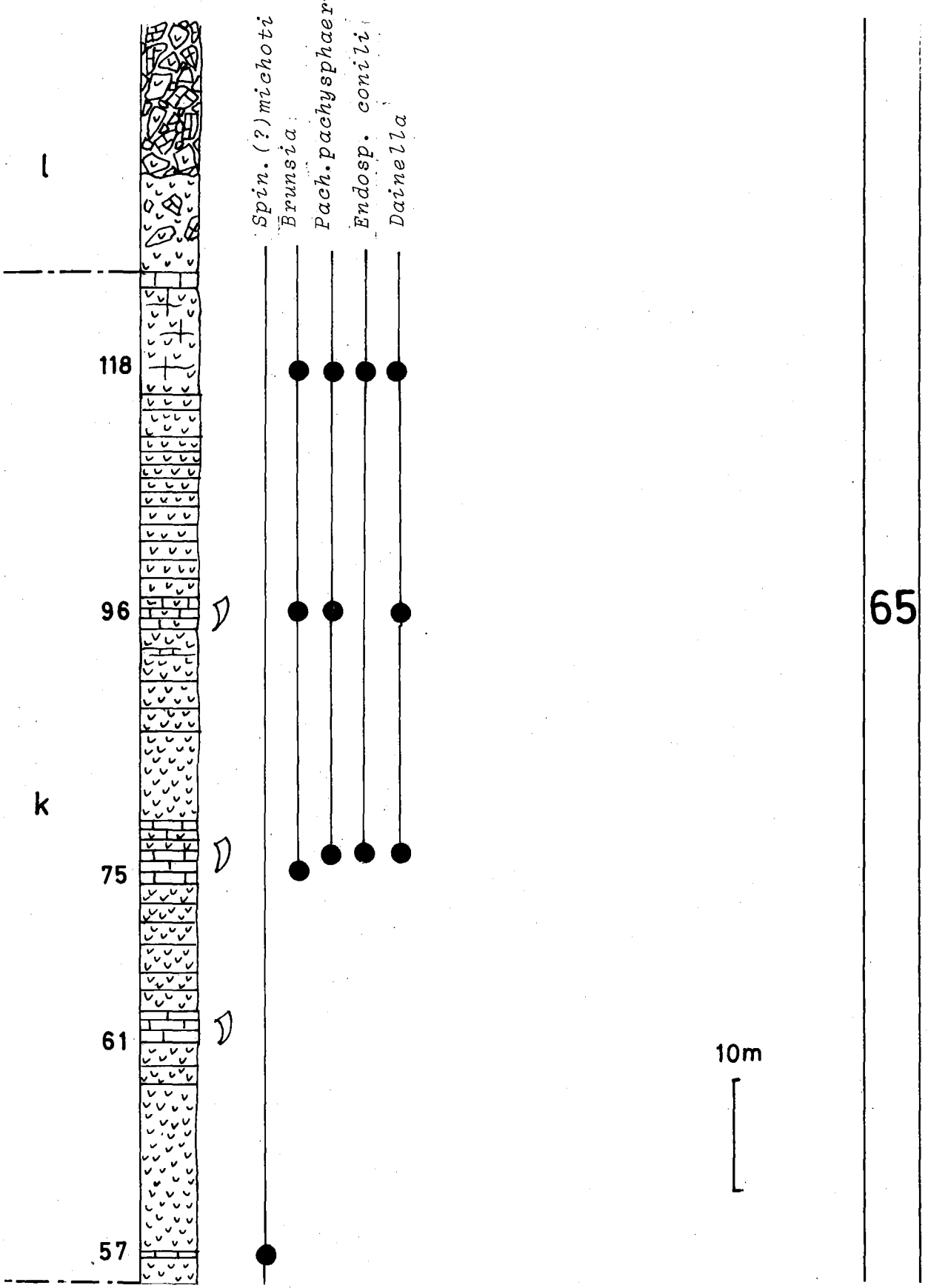
D④h (M.g.m.65)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Spin. (?) michoti
Brunsia
Pach. pachysphaerica
Endosp. conili
Dainella
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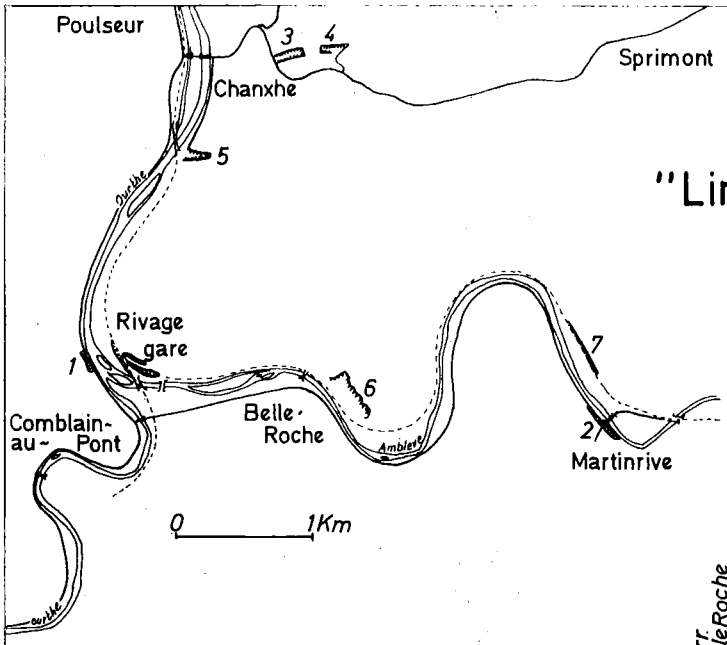
D④

"Limite Tn-V dans la vallée de l'OURTHE,,



Dossiers SERV. GEOL.
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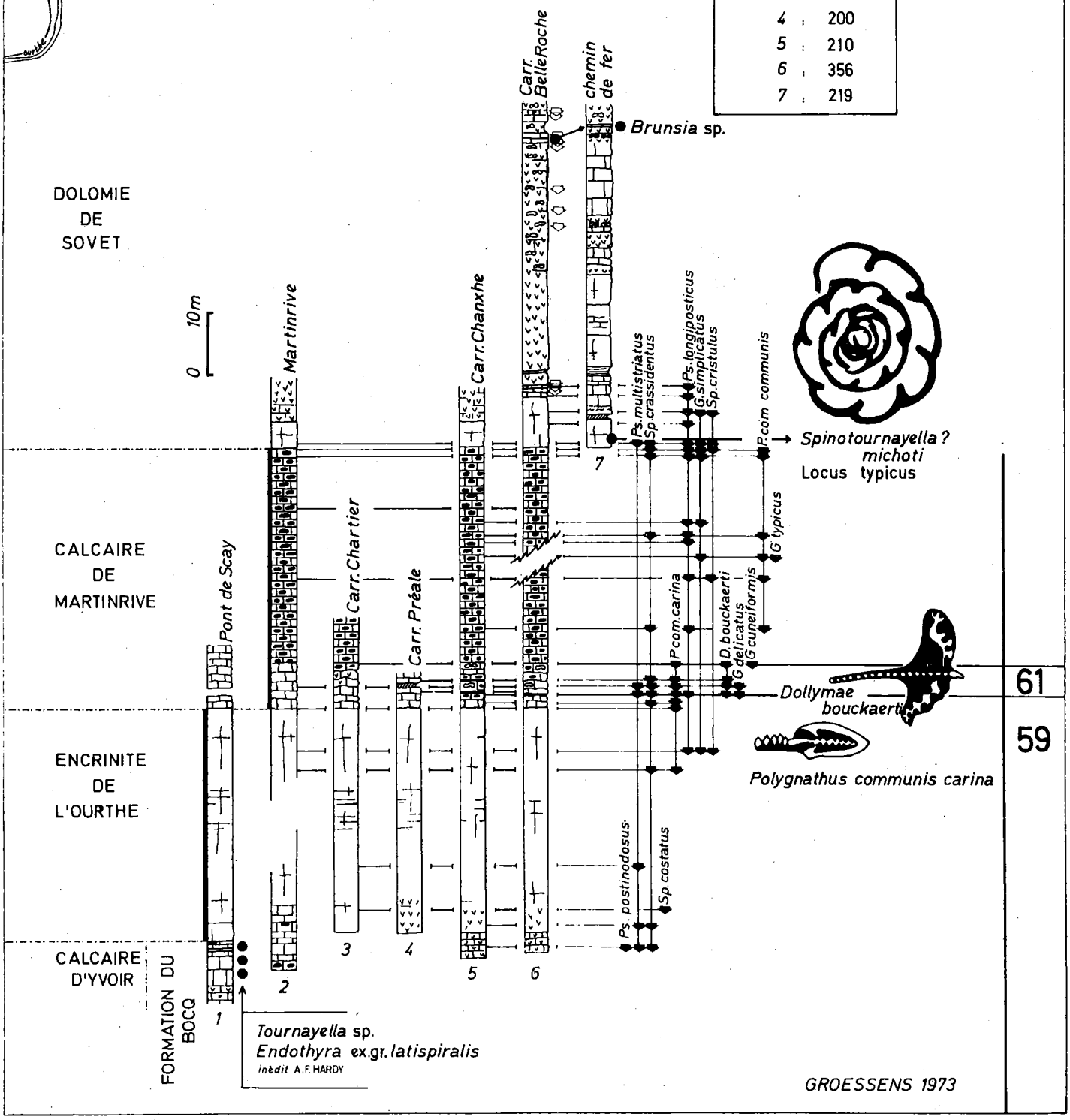
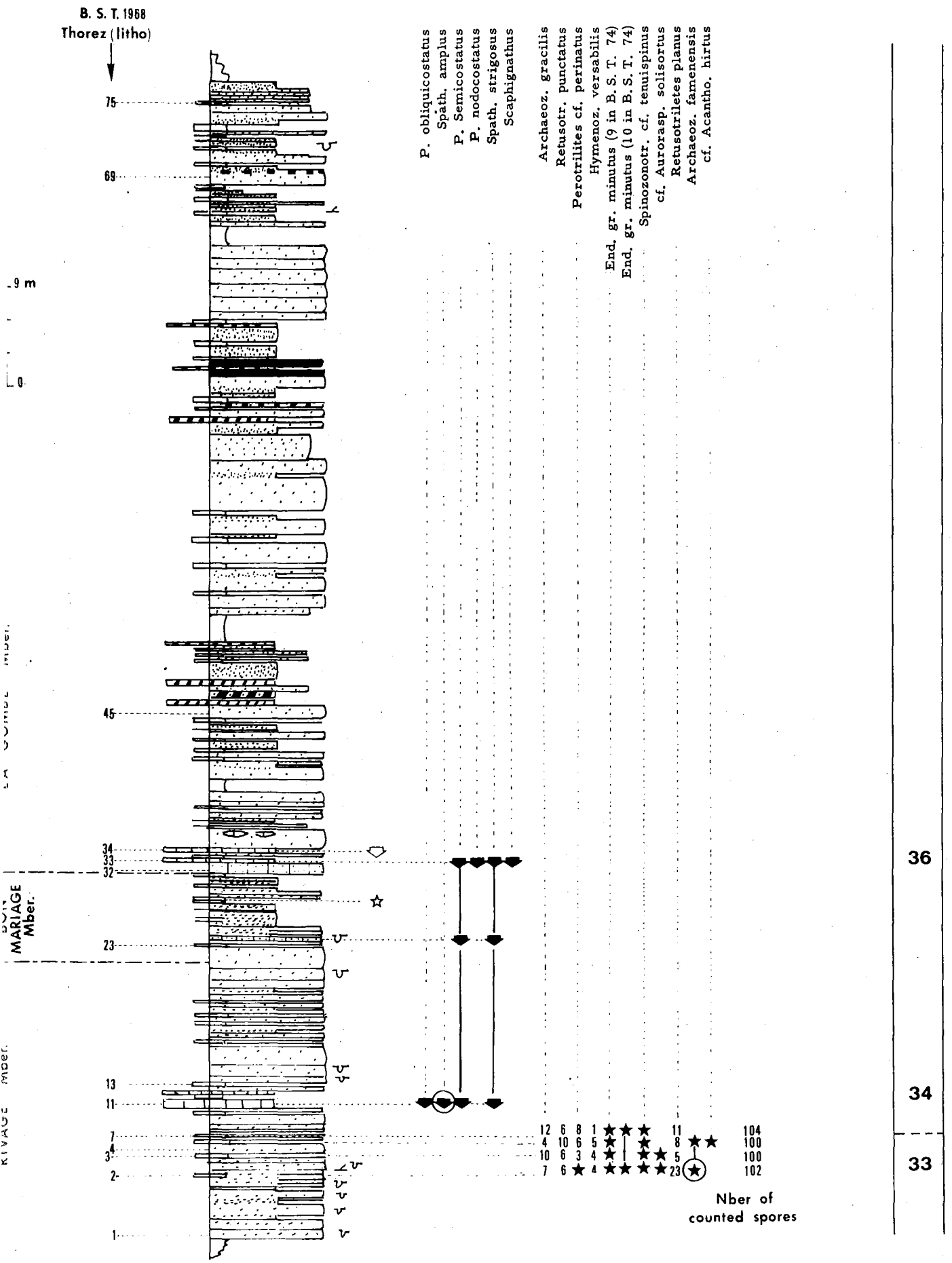


RIVAGE CARRIERE

D⑤ (Mgm 33-36)

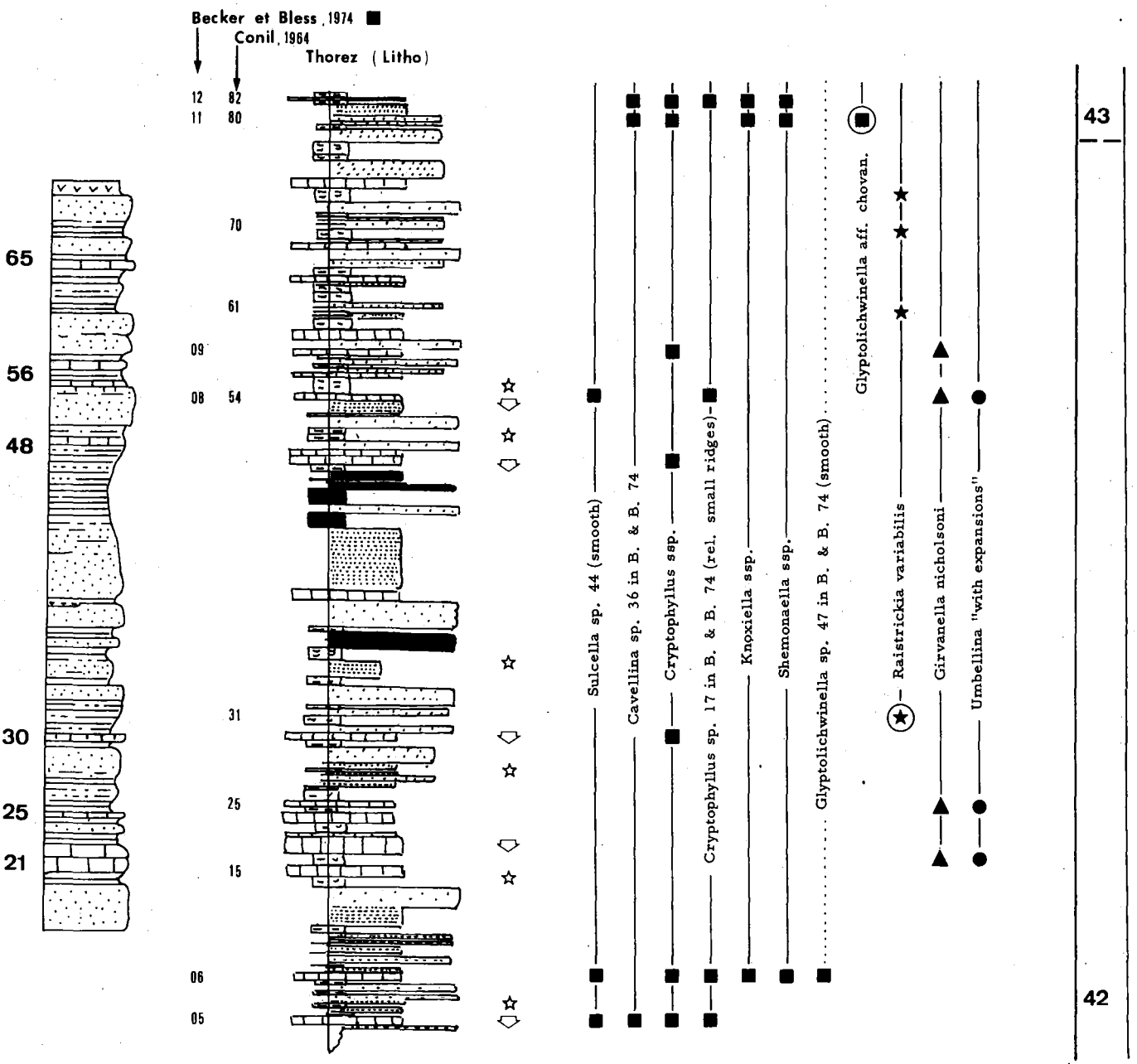
1968. J. BOUCKAERT, M. STREEL & J. THOREZ, Ann. Soc. Géol. Belgique, 91 hors-texte I.



CHANXHE

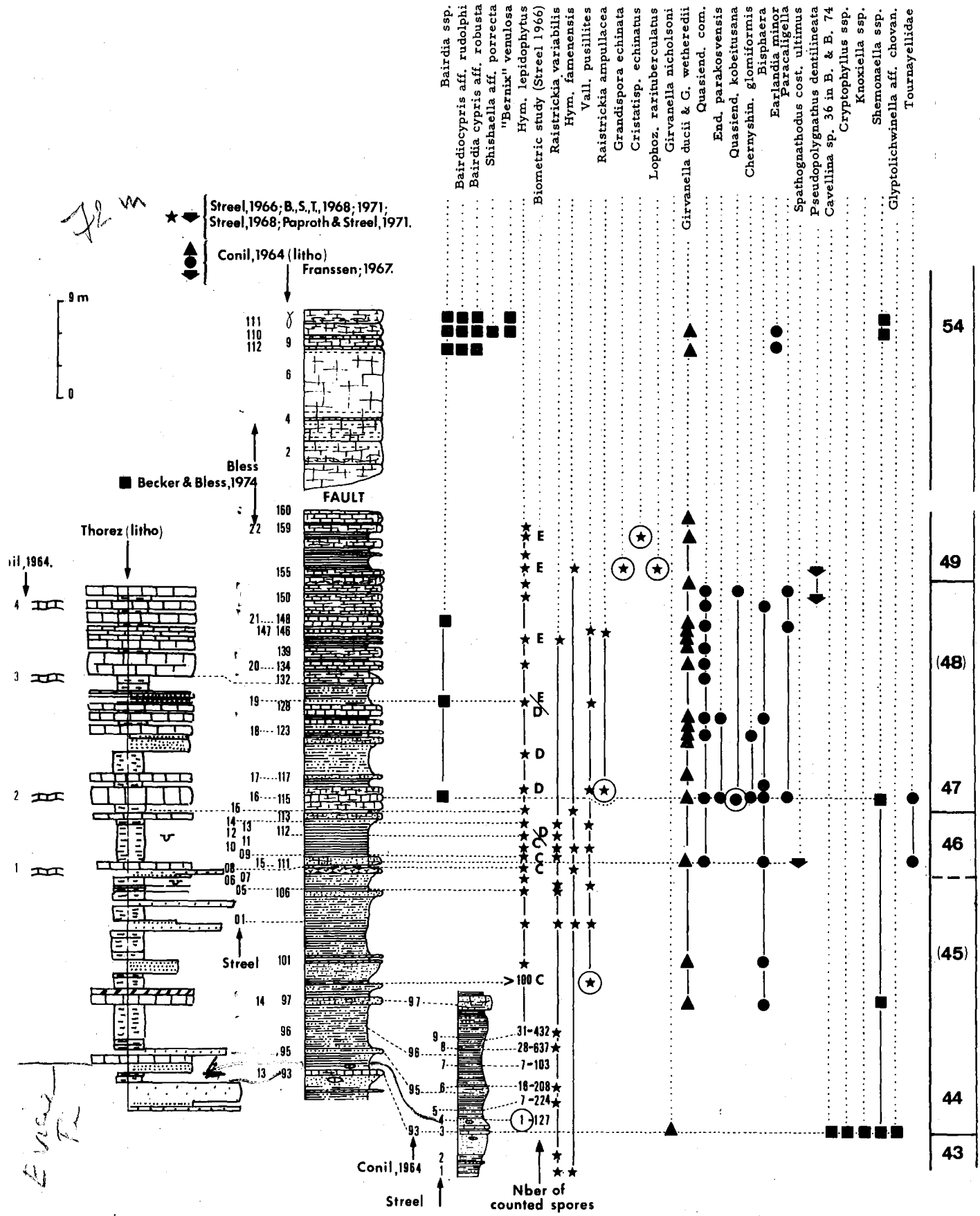
D⑥a (M g m 42-43)

1964. R. CONIL, Mém. Acad. Roy. Belg., Cl. Sc., Mém. 4°, 2, XV, 4, pp. 50-51, pls. III-IX.
1966. M. STREEL, Ann. Soc. Géol. Belgique 89, 3, p. 65, h. t. II
1967. L. FRANSSEN, Ann. Soc. Géol. Belgique 90, pp. 571-580, h. t.
1968. M. STREEL, C. R. 6è congr. carb. Sheffield, I, pp. 3-18.
1968. J. BOUCKAERT, M. STREEL & J. THOREZ, Ann. Soc. Géol. Belgique, 91, h. t. I.
1968. R. CONIL, Ann. Soc. Géol. Belgique, 90, p. 726, h. t. III.
1970. R. CONIL, J. M. GRAULICH, Prof. Paper, Serv. Géol., n° 4, pls. 11, 12.
1971. J. BOUCKAERT, M. STREEL, J. THOREZ, Coll. Strat. Carb. Liège (1970), p. 42-43.
1971. J. BOUCKAERT, R. CONIL, A. DELMER, E. GROESSENS. G. MORTELMANS, H. PIRLET. M. STREEL. J. THOREZ, Prot. Paper. Serv. Géol., n° 2, p. 6.
1974. G. BECKER, M. J. M. BLESS, Public Symposium Namur.



CHANXHE

D⑥b (Mgm 43-54)



POULSEUR ROUTE

D ⑦ · (M g m 32-34)

1965. J. BOUCKAERT, W. ZIEGLER, J. THOREZ, Mém. Expl. Cartes Géol., 5, p. 15 : Esneux exp. n° 181
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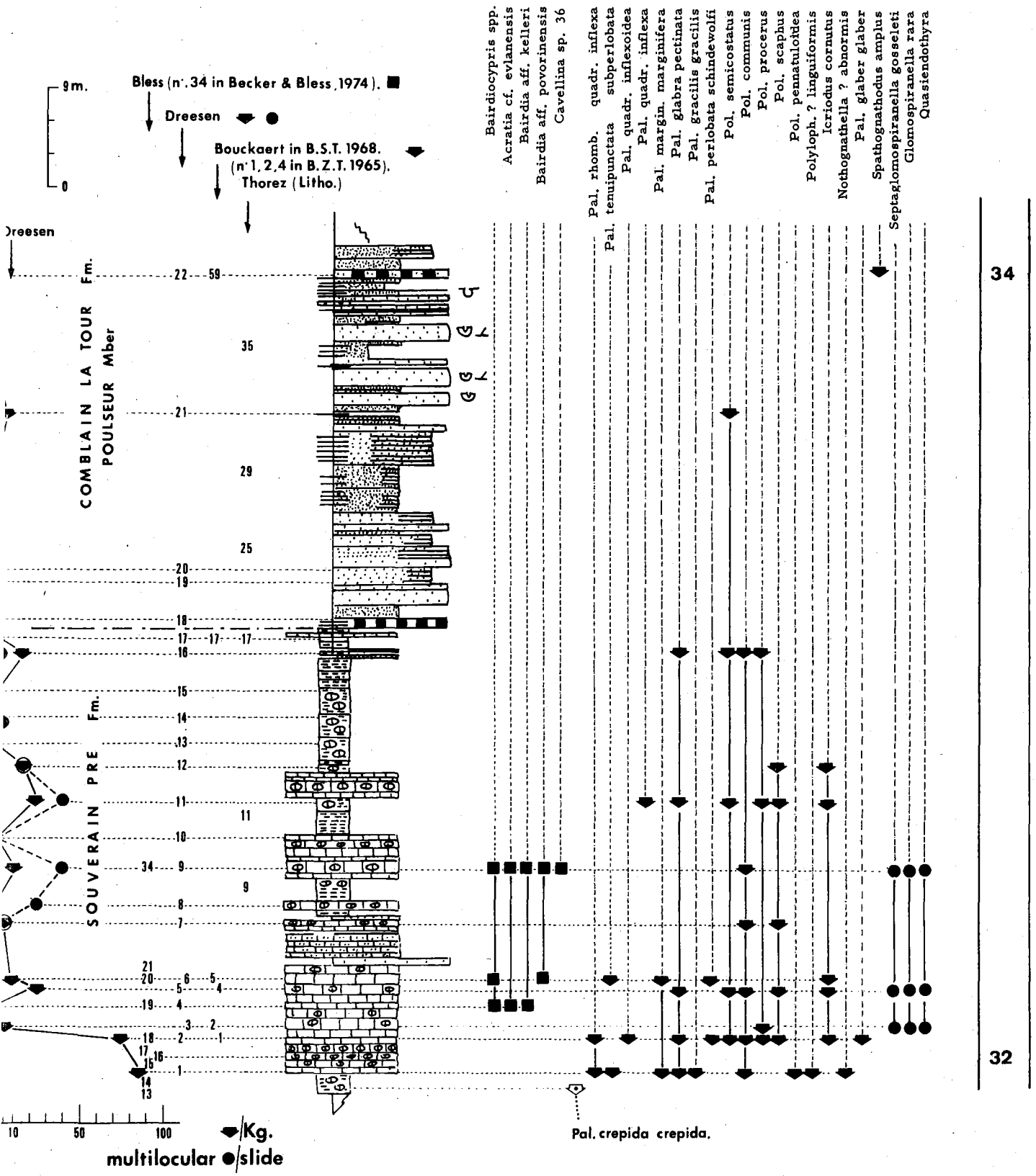

LA GOMBE – MONTFORT

D⑧a (Mgm 36 -?39)

1968. J. BOUCKAERT, M. STREEL & J. THOREZ, Ann. Soc. Géol. Belgique, 91 : hors-texte I.
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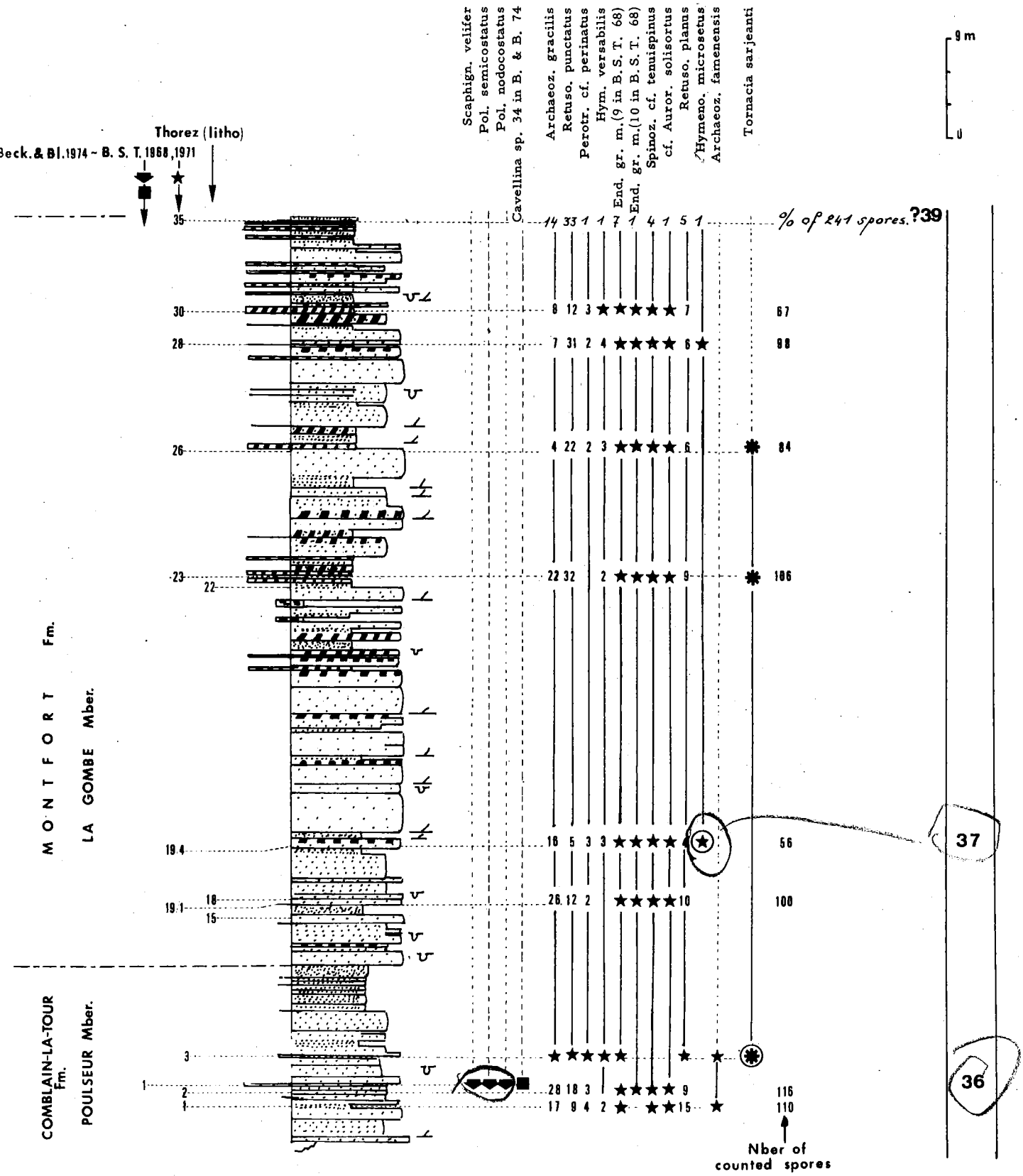
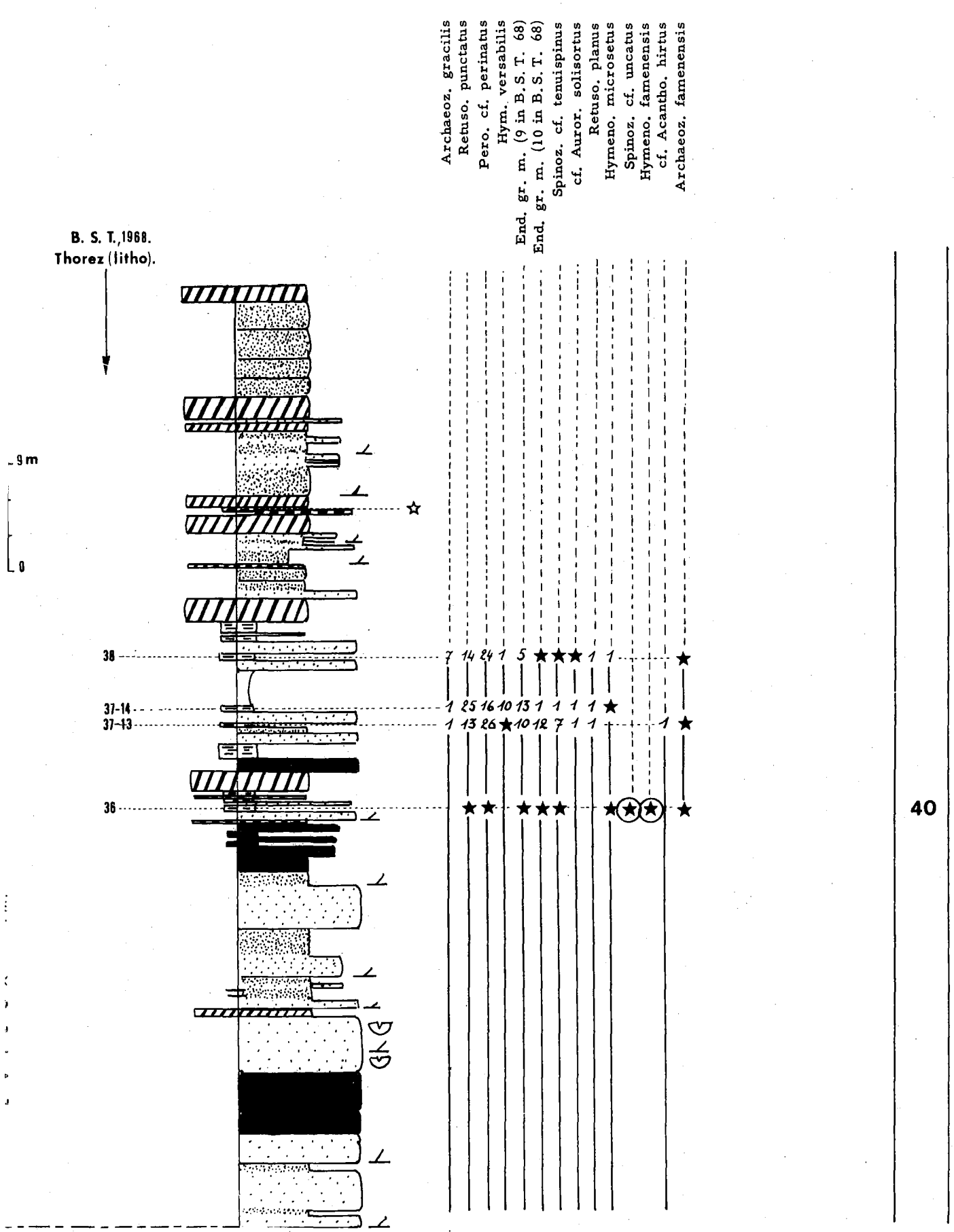


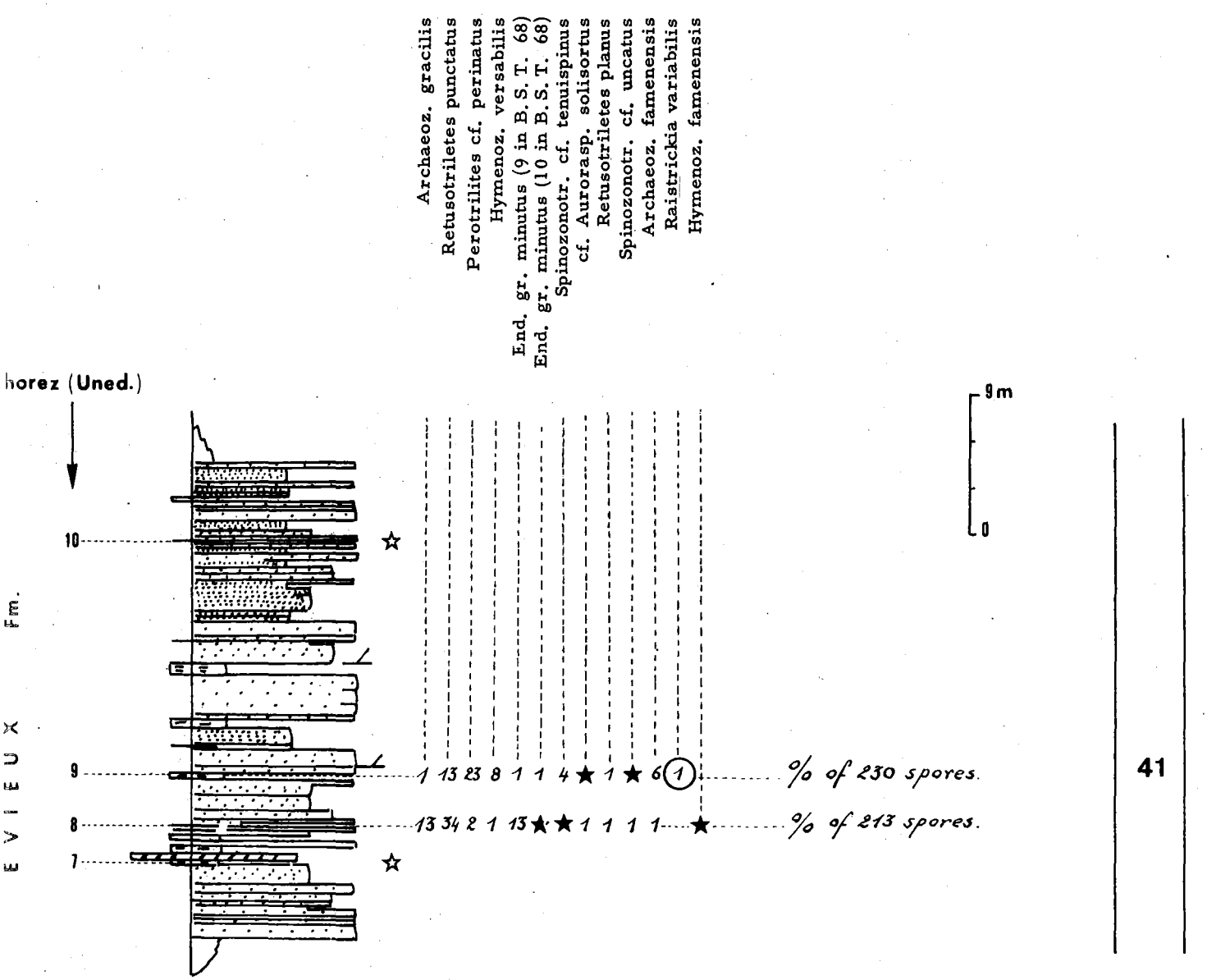
LA GOMBE – MONTFORT

D⑧b (Mgm 40)



POULSEUR CHATEAU

D⑨ (Mgm 41)



SOUVERAIN-PRE (GARE-FLAGOTTIER ROAD-QUARRY) D⑩a (Mgm 32-37)

1968. J. BOUCKAERT, M. STREEL & J. THOREZ, Ann. Soc. Géol. Belgique, 91 : hors-texte I.
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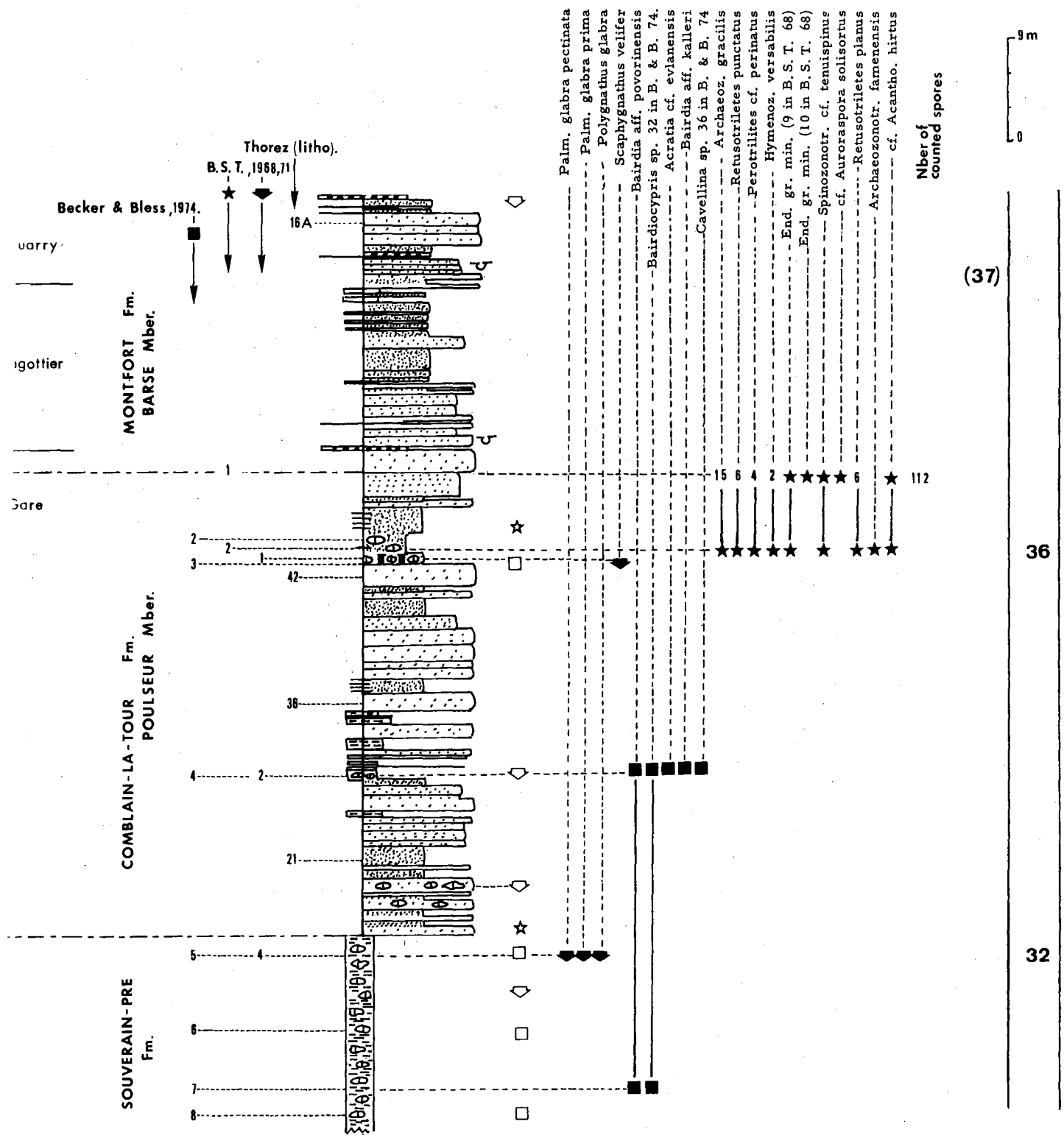
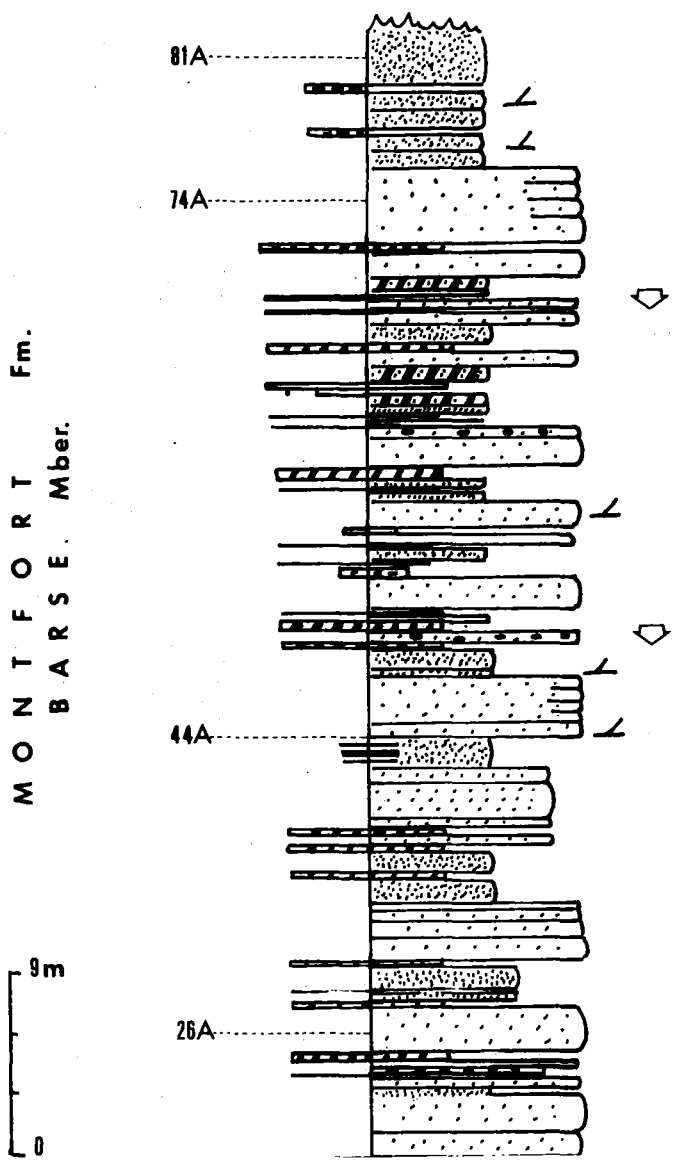


SOUVERAIN-PRE (QUARRY)

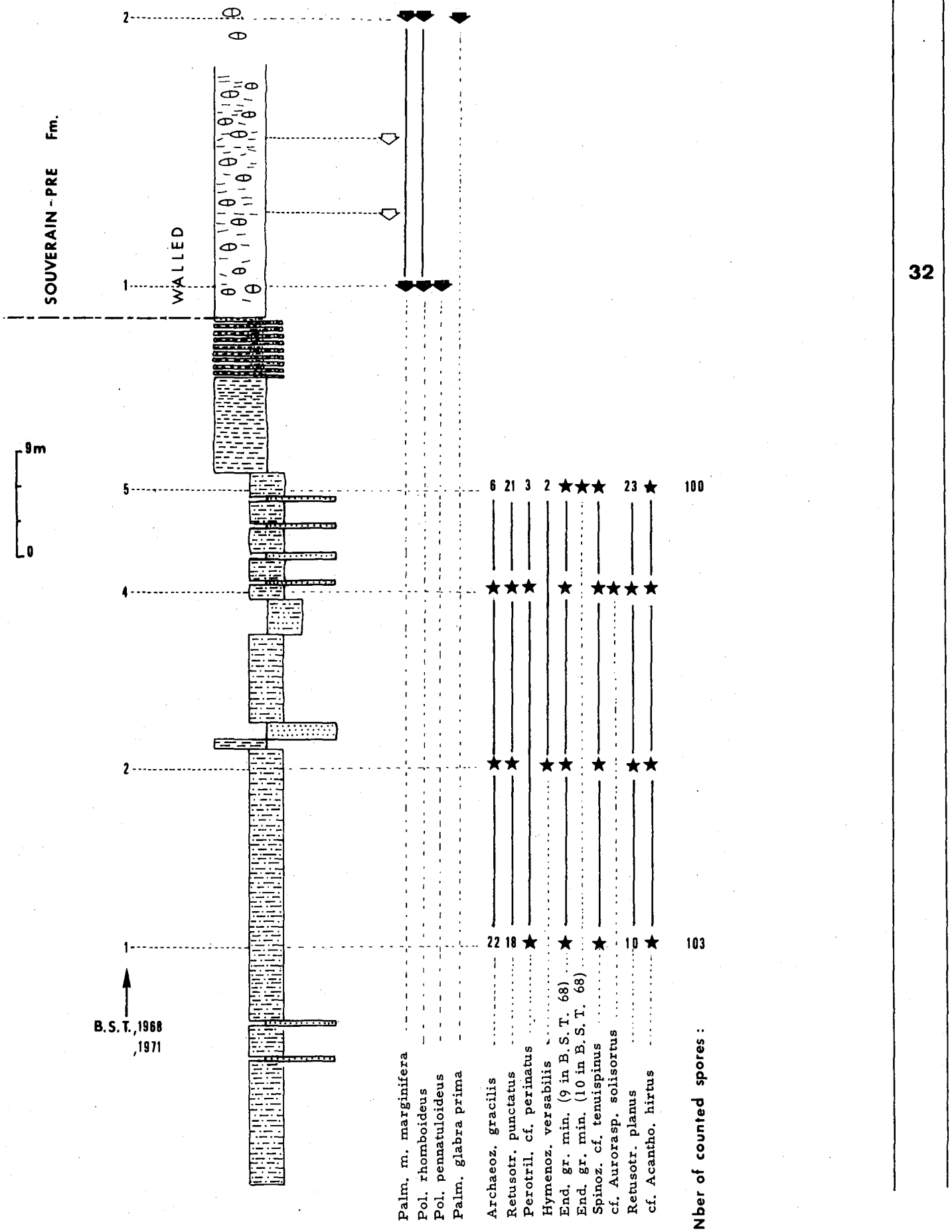
D⑩b



ESNEUX

D⑪ (Mgm 32)

1968. J. BOUCKAERT, M. STREEL & J. THOREZ, Ann. Soc. Géol. Belgique, 91 : hors-texte-1.
1971. J. BOUCKAERT. M. STREEL & J. THOREZ, Coll. Strat. Carb. Univ. Liège (1970), 55 : p. 32-33.



EVIEUX

D⑫a (Mgm ?36-37)

1968. J. BOUCKAERT, M. STREEL & J. THOREZ, Ann. Soc. Géol. Belgique, 91 : hors-texte I.
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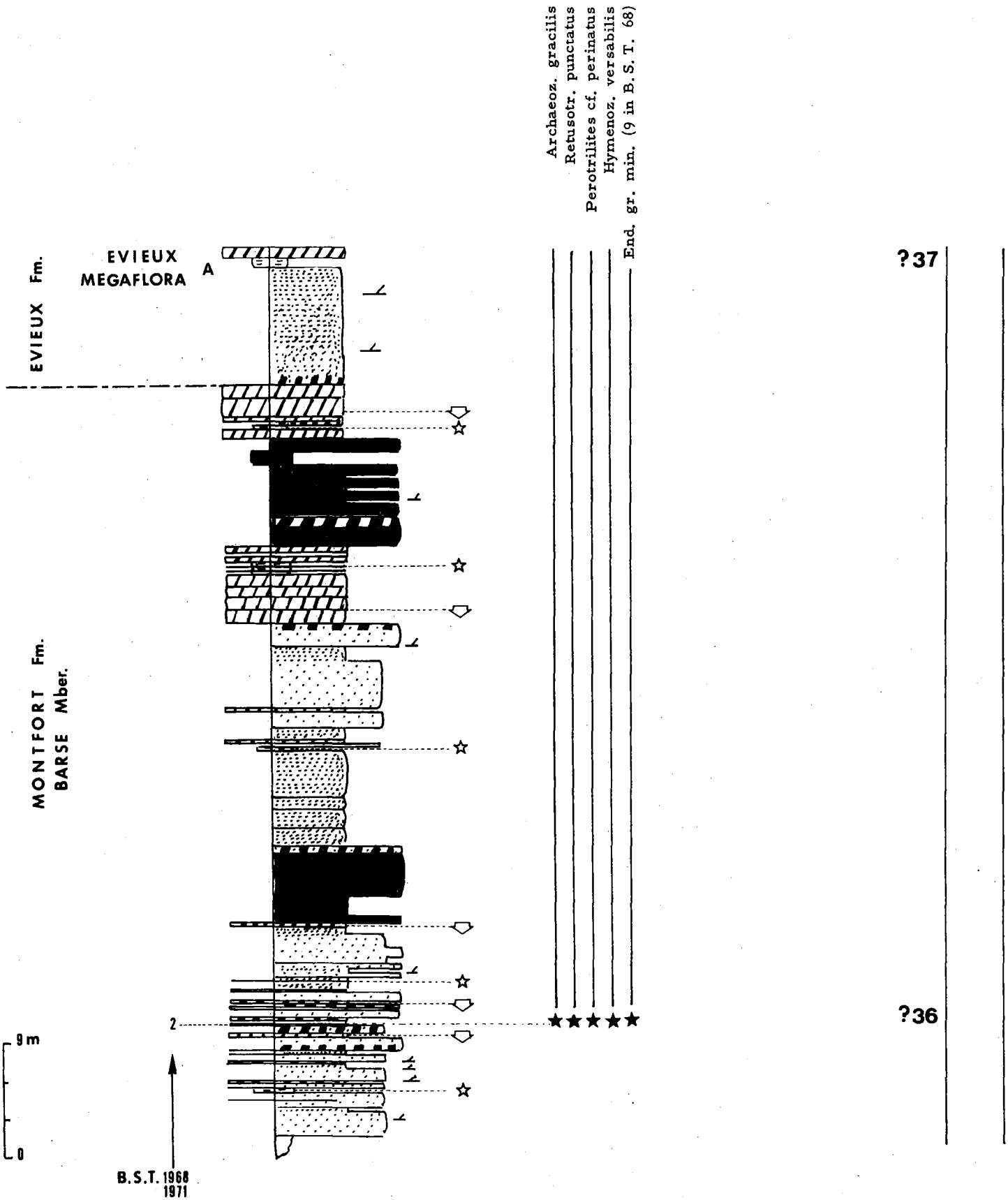
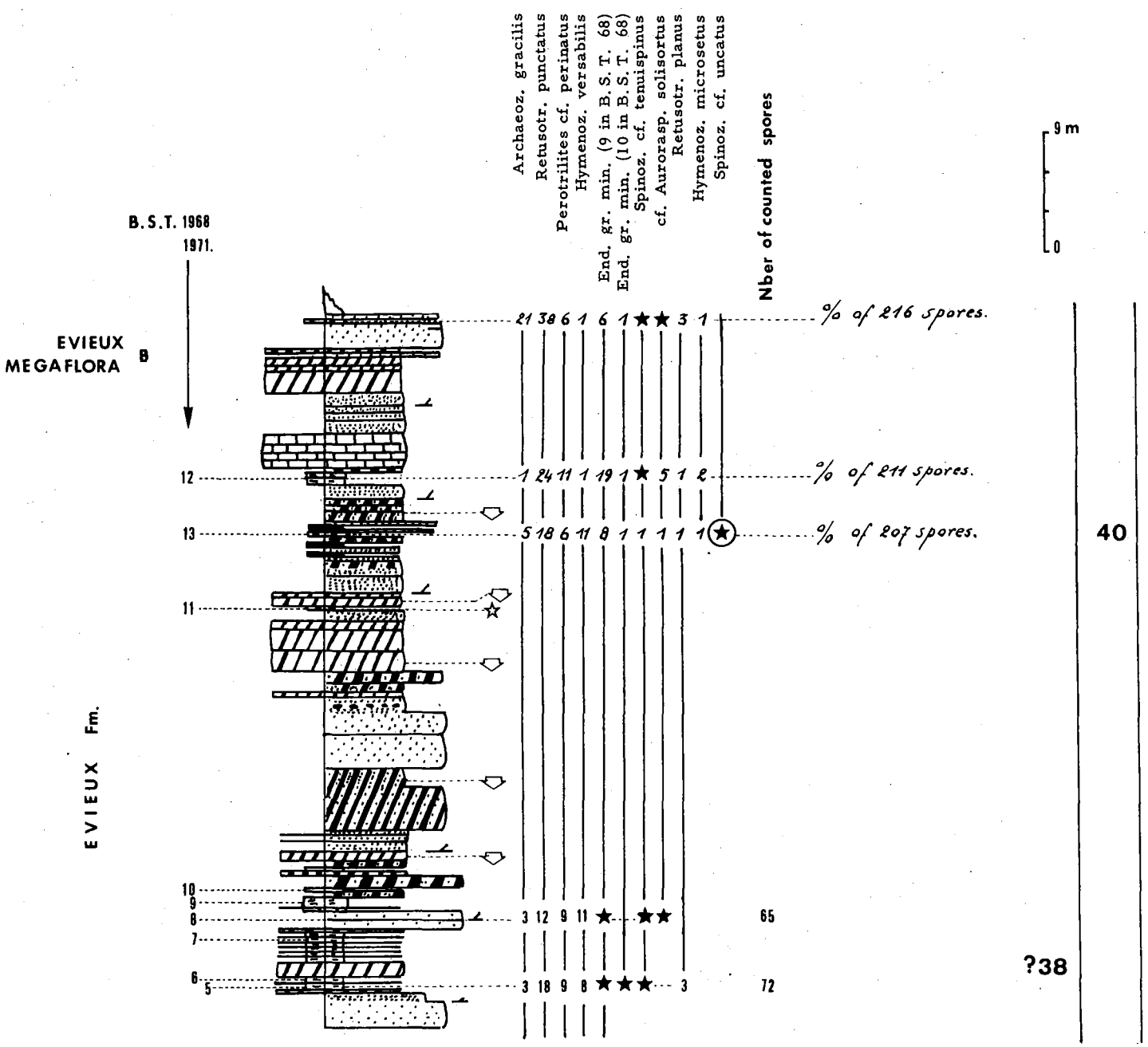


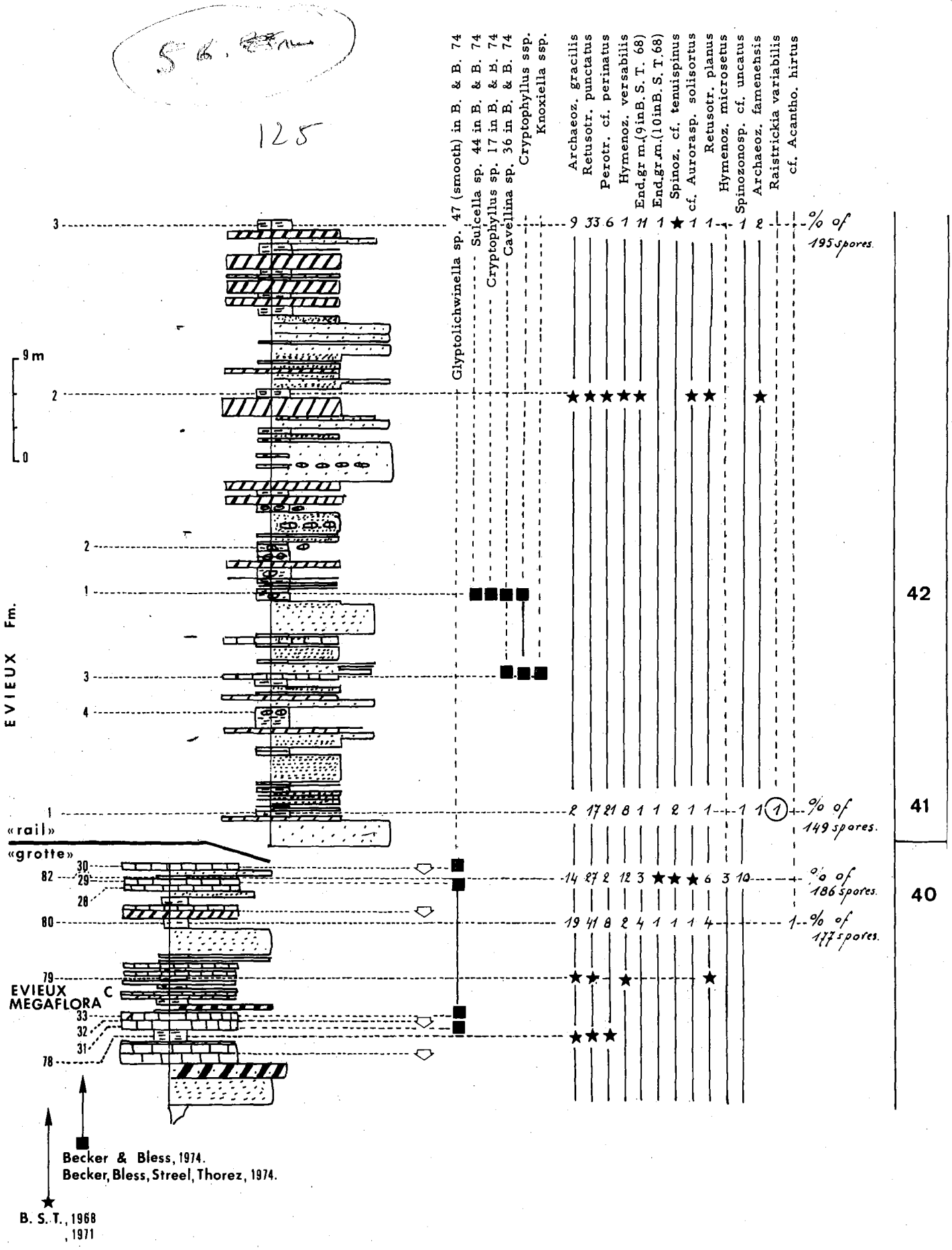
EVIEUX

D⑫b (Mgm ?38-40)



EVIEUX

D⑫c (Mgr



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BELGIAN MICROPALEONTOLOGICAL LIMITS

FROM EMSIAN TO VISEAN – SEPTEMBER 1st to 10th

EXCURSION E

Guides :

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PEL J (leader)

GUIDEBOOK

Edited by

J. BOUCKAERT & M. STREEL

GIVET - MONT D'HAURS

CALCAIRE DE GIVET

FORM. DE CHARLEMONT (J. PEL, 1974)
DES TROIS FONTAINES (M. ERRERA et AL. 1972)
MEMBRE DE HOTTON (J. PEL, 1974)

E①a - M g-m. 13-15

J. PEL, 1967 - Intern. Sympos. on Devonian System Calgary - T. 2
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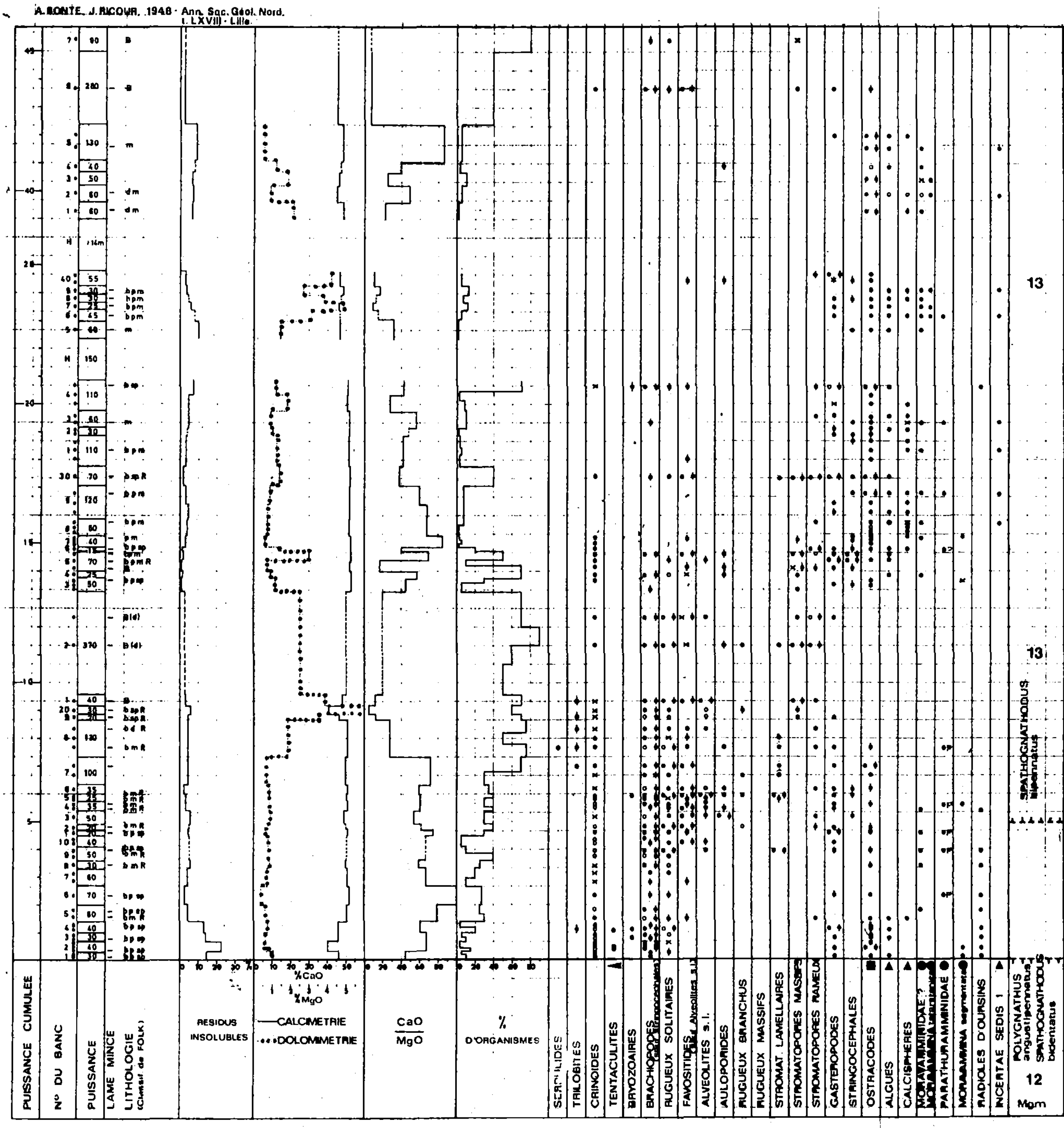
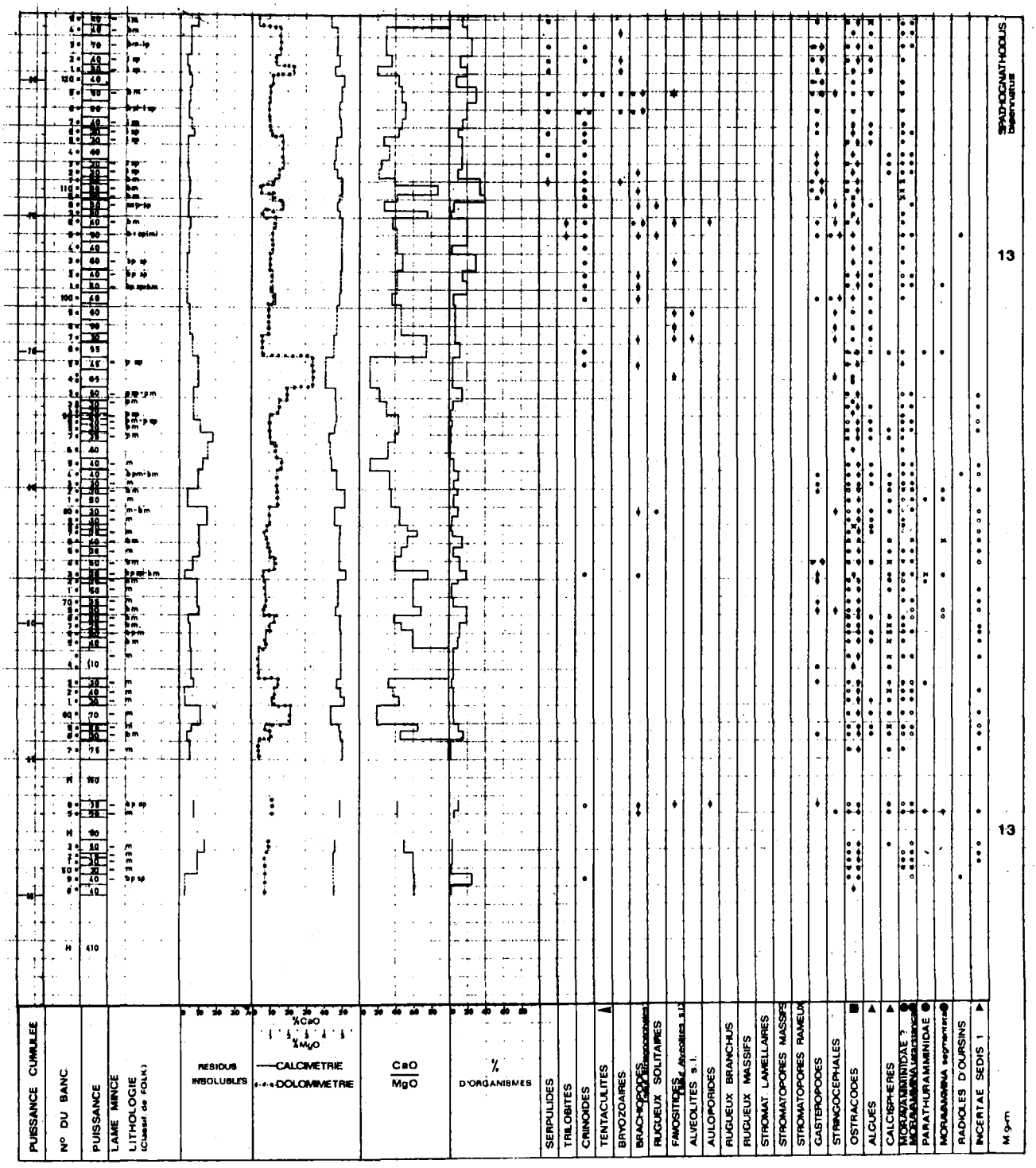
A. BONTE, J. RICOUR, 1948 - Ann. Soc. Géol. Nord. t. LXVII - Lille.



GIVET - MONT D'HAURS

MEMBRE DE HOTTON

E①h · M.g.m. 12 - 13



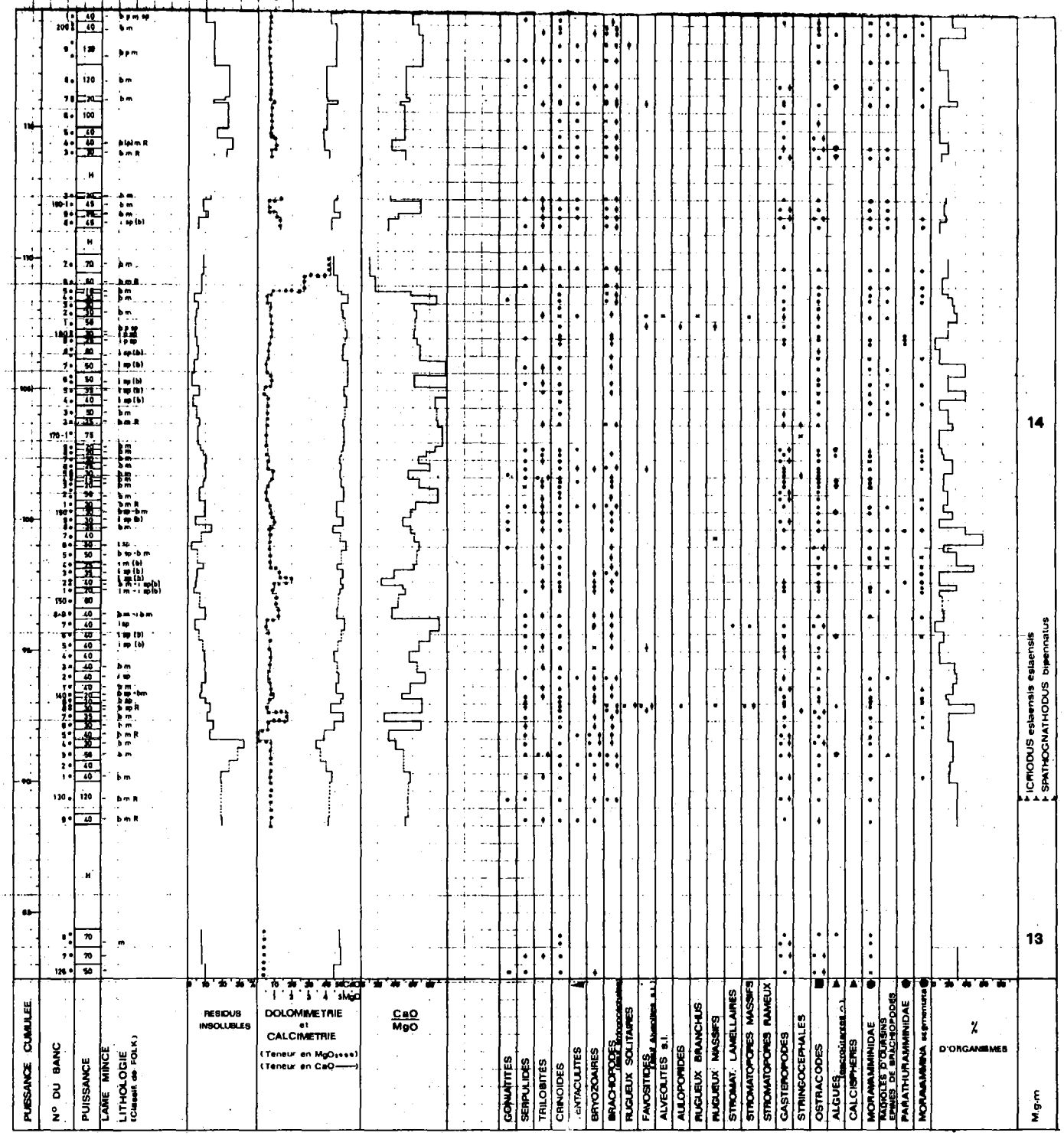
GIVET - MONT D'HAURS

E(1)c [M.g-m. 13-15]

CALCAIRE DE GIVET

FORMATION DE CHARLEMONT

MEMBRE DES TERRES D'HAURS



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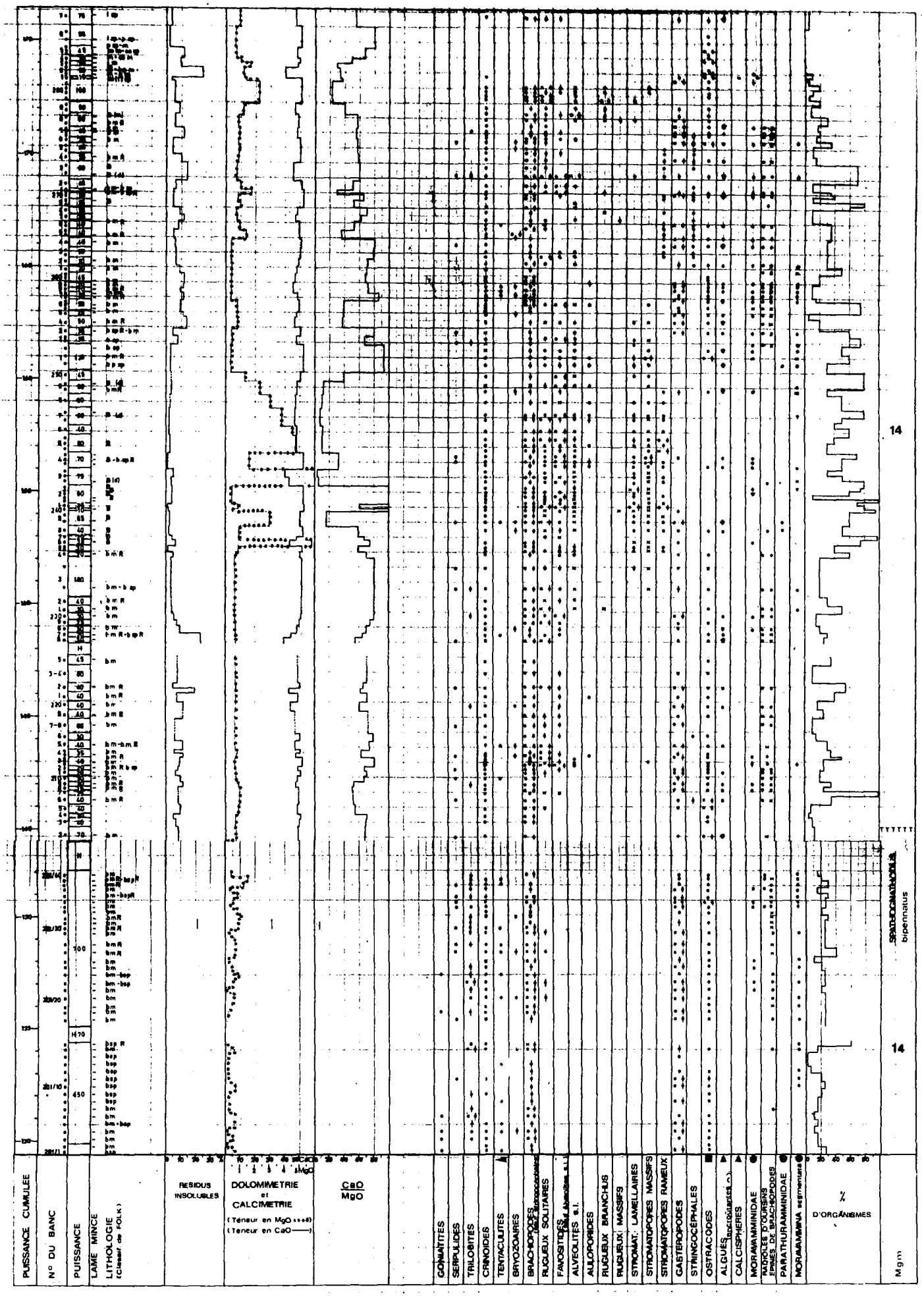
MEMBRE DES TERRES D'HAURS



GIVET - MONT D'HAURS

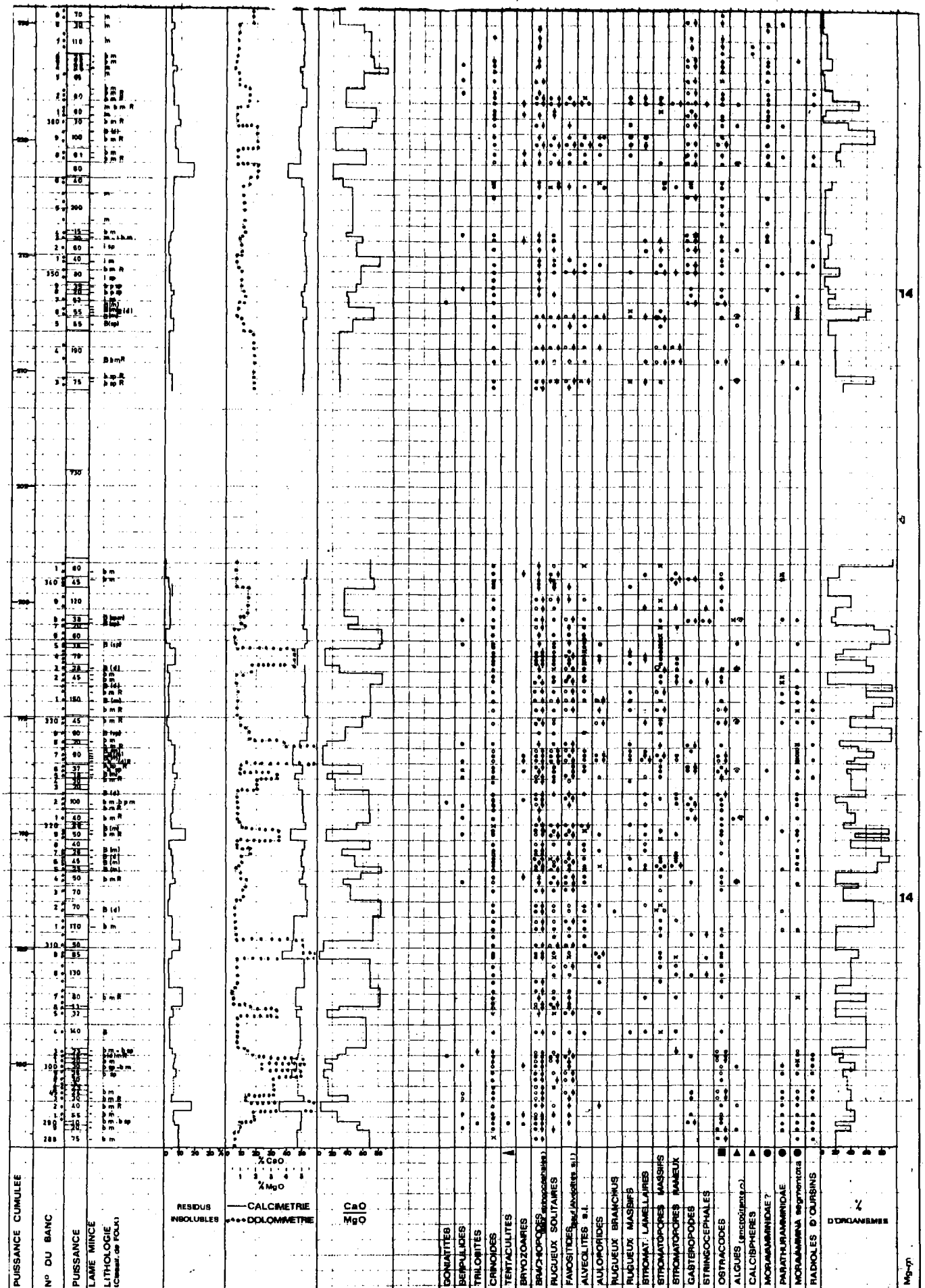
E①a - M. g-m.13-15

CALCAIRE DE GIVET

FORMATION DE CHARLEMONT (J. PEL. 1974)

DU MONT D'HAURS (M. ERRERA et Al. 1972)

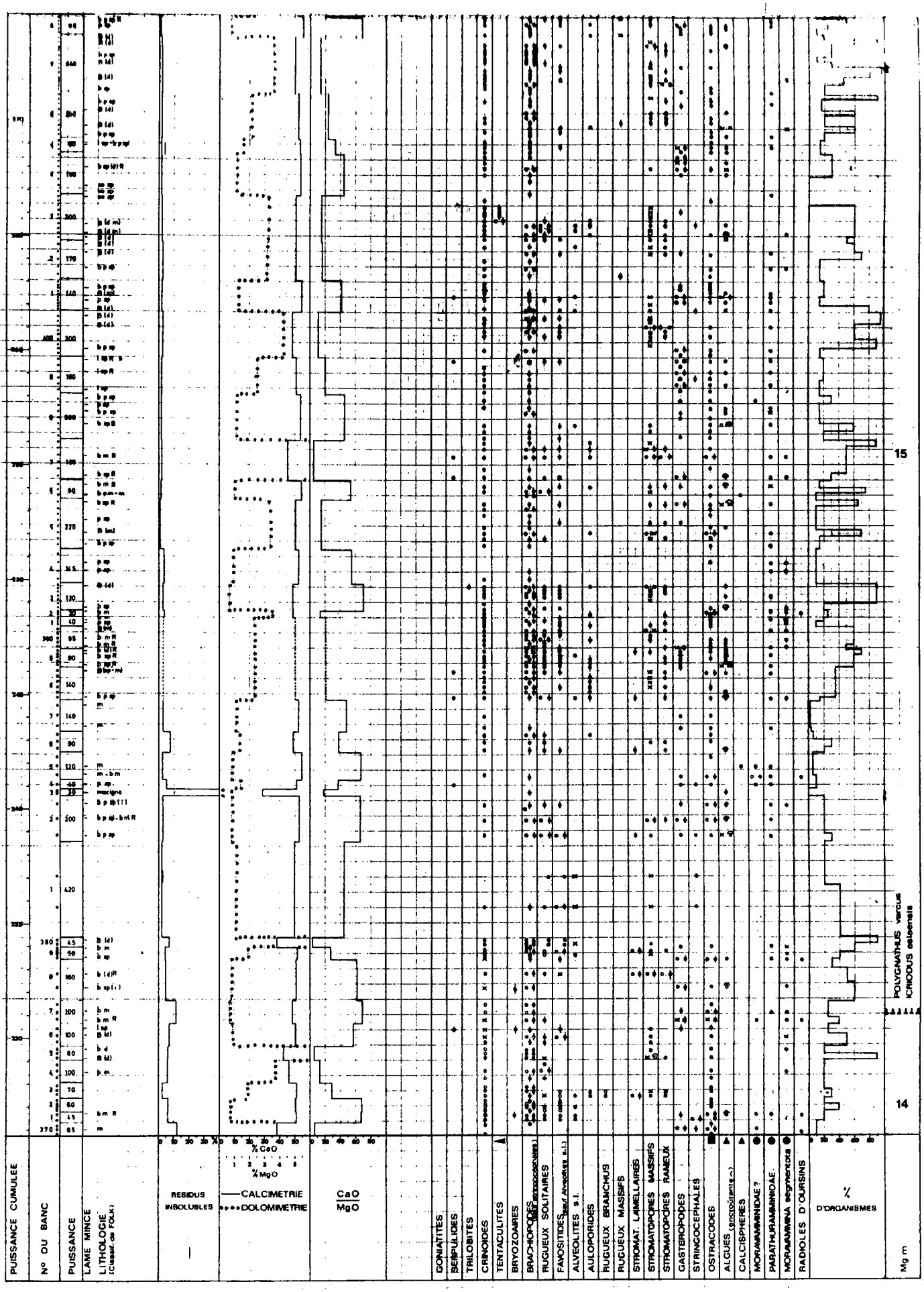
MEMBRE DU MONT D'HAURS (J. PEL. 1974)



GIVET - MONT D'HAURS

E(1)f M.g h 13-15

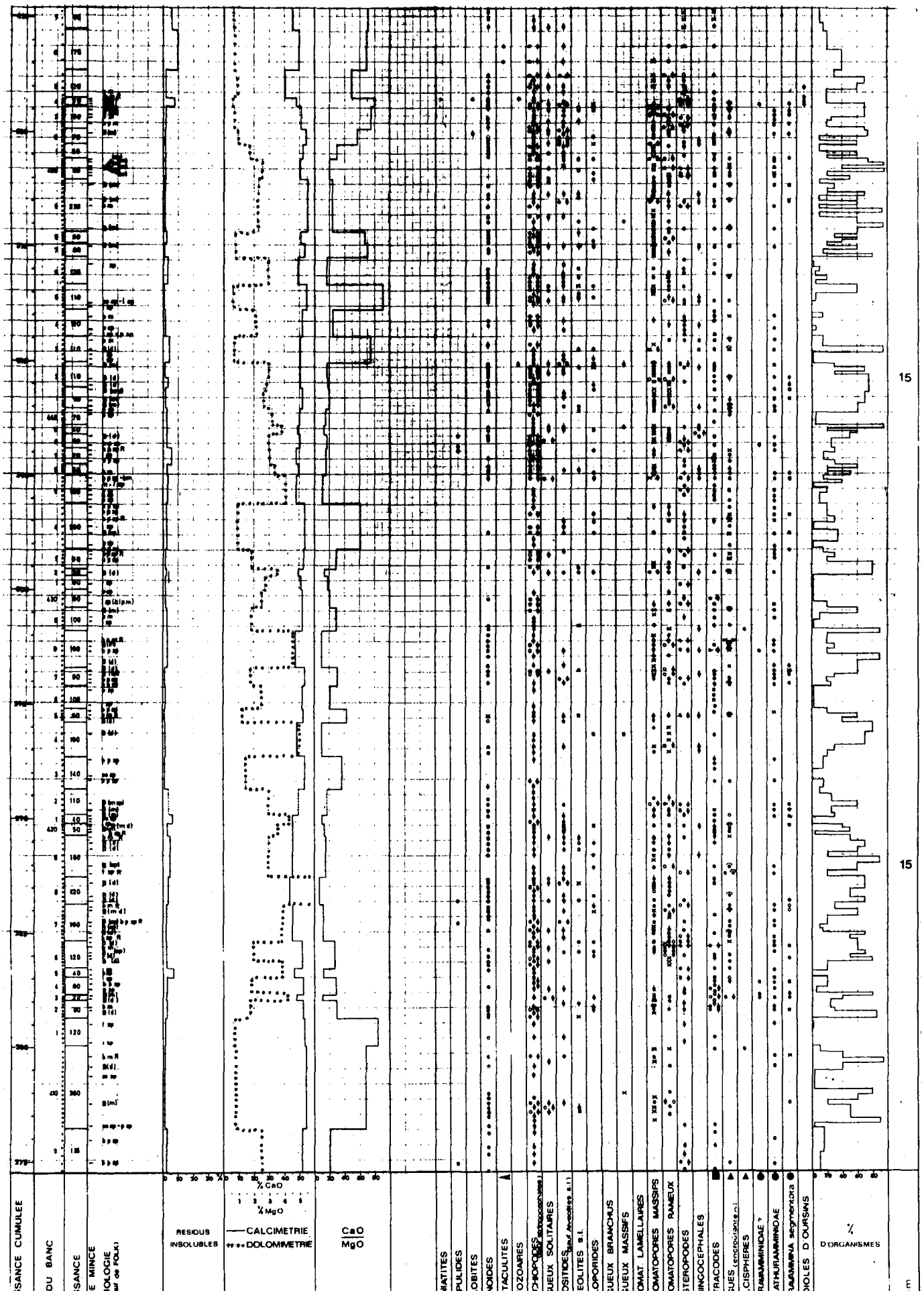
MEMBRE DU MONT D'HAURS



GIVET - MONT D'HAURS

E(2)d - Mgms 13-15

MEMBRE DU MONT D'HAURS



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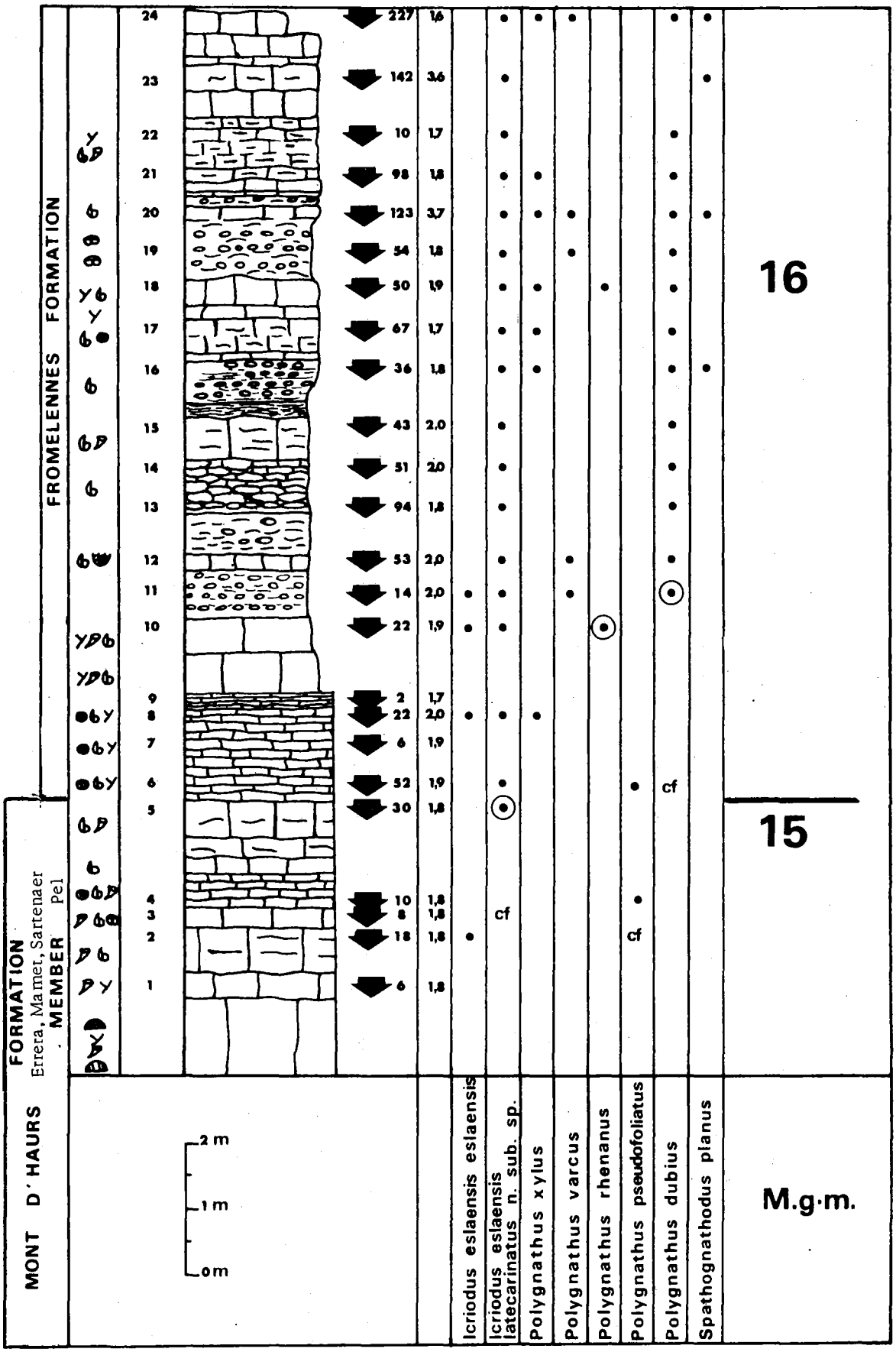

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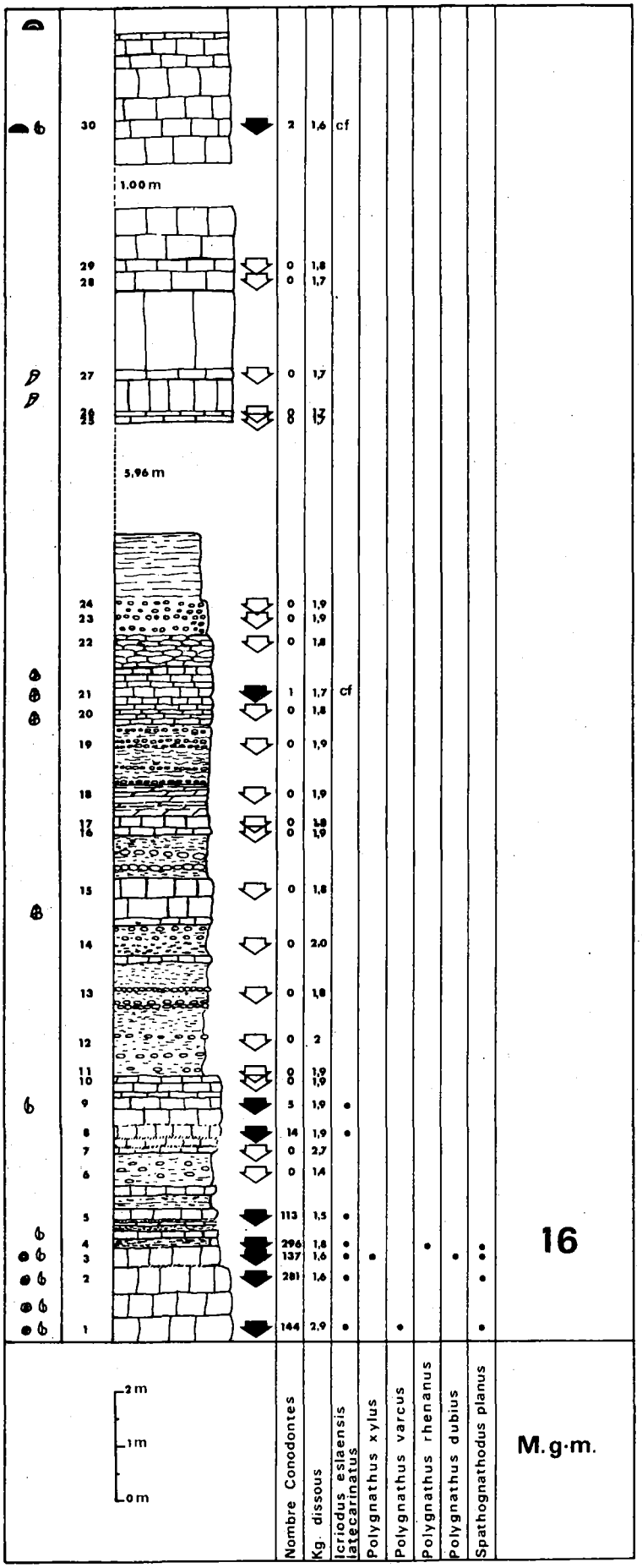

PONDROME

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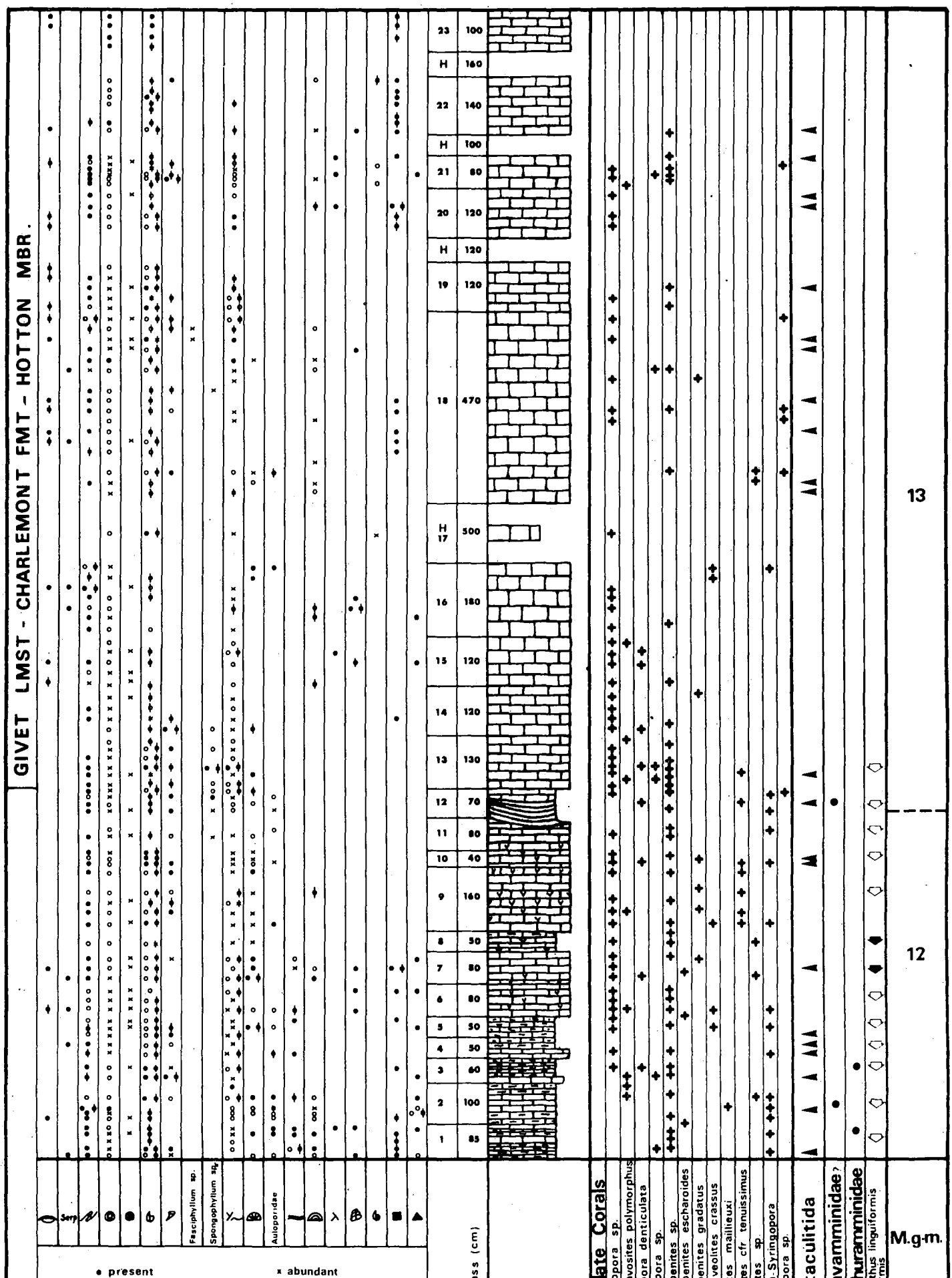

WELLIN

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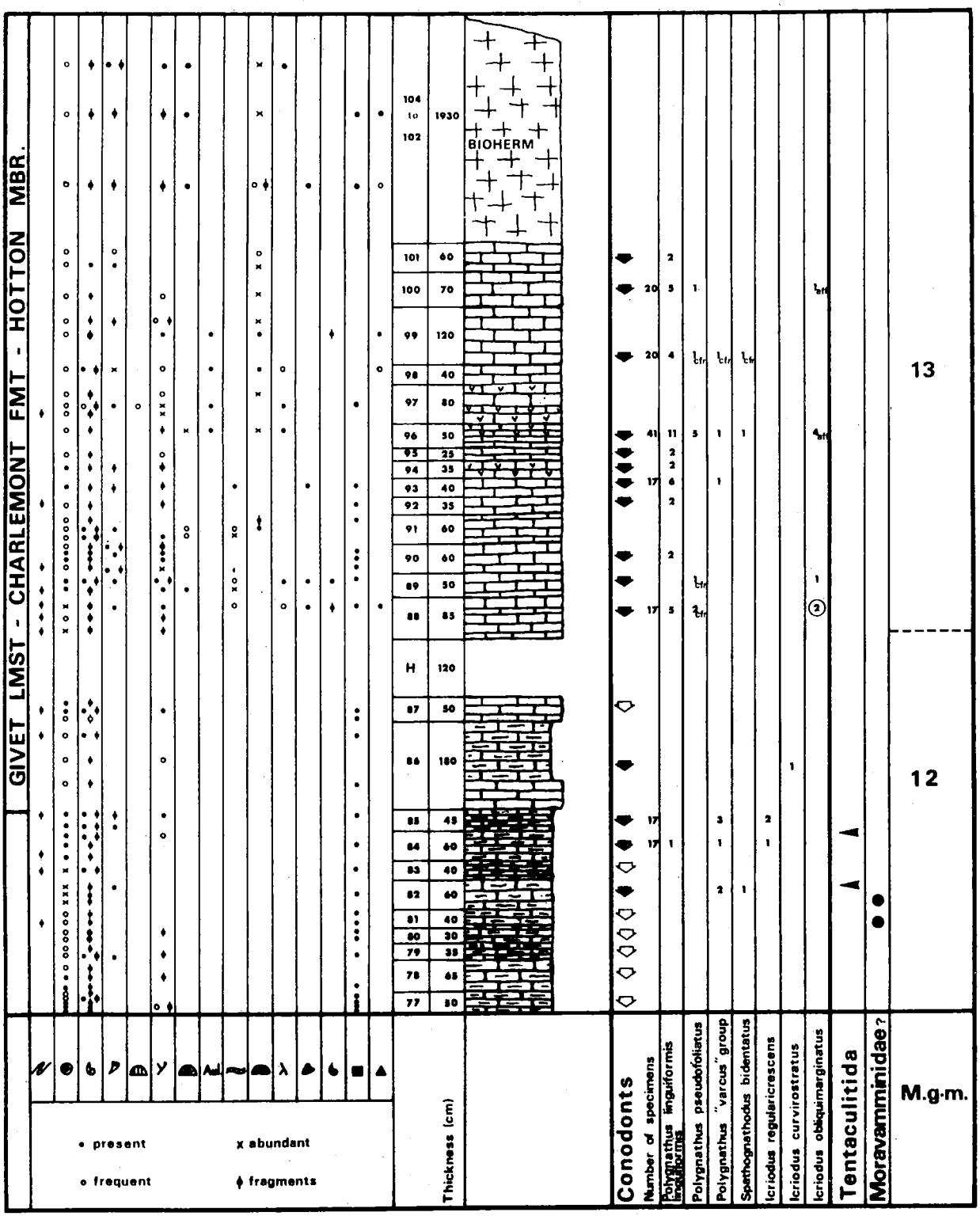

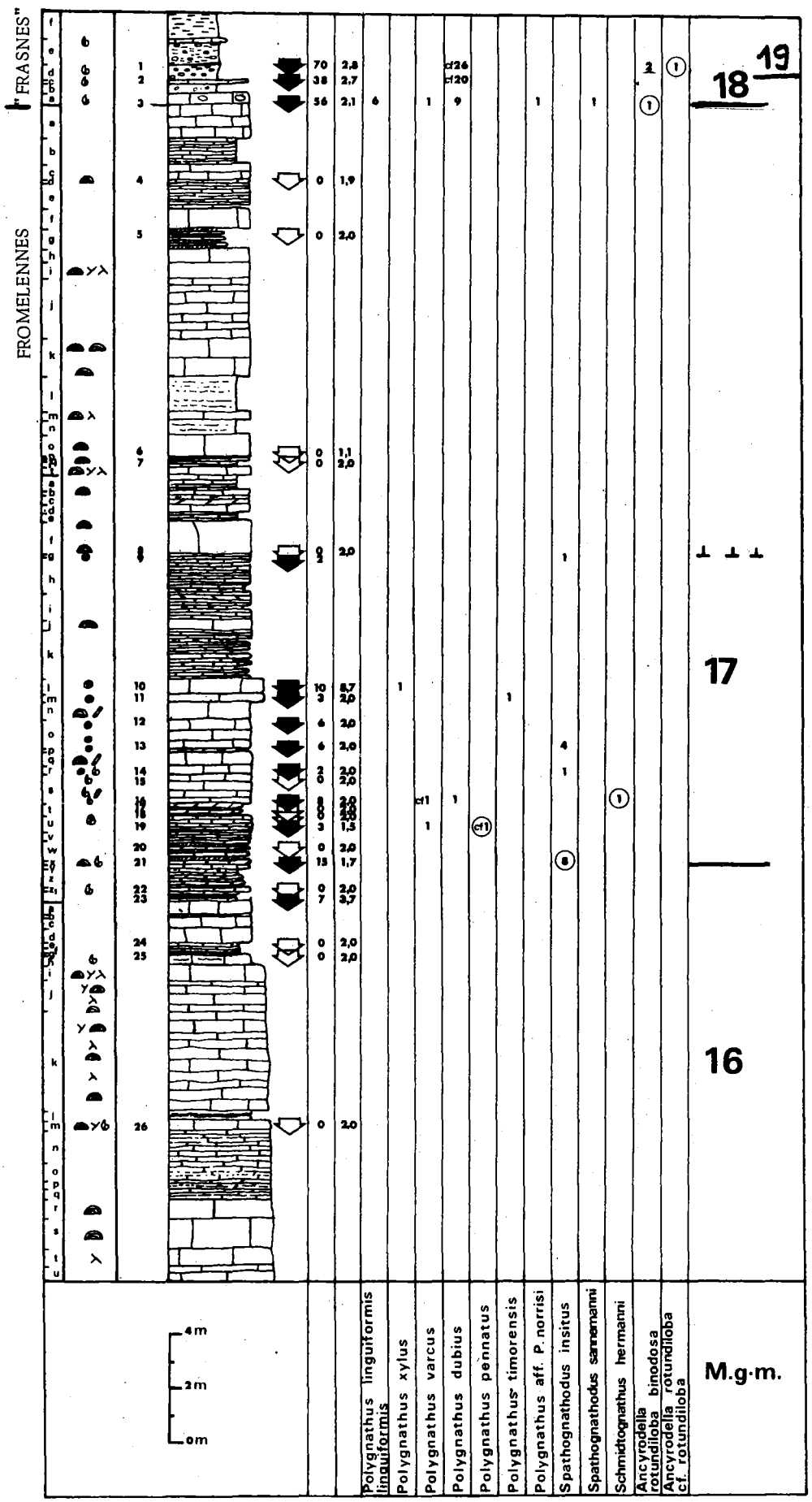
AVE et AUFFE
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FRASNES"
FROMELENNES
4m
2m
0m
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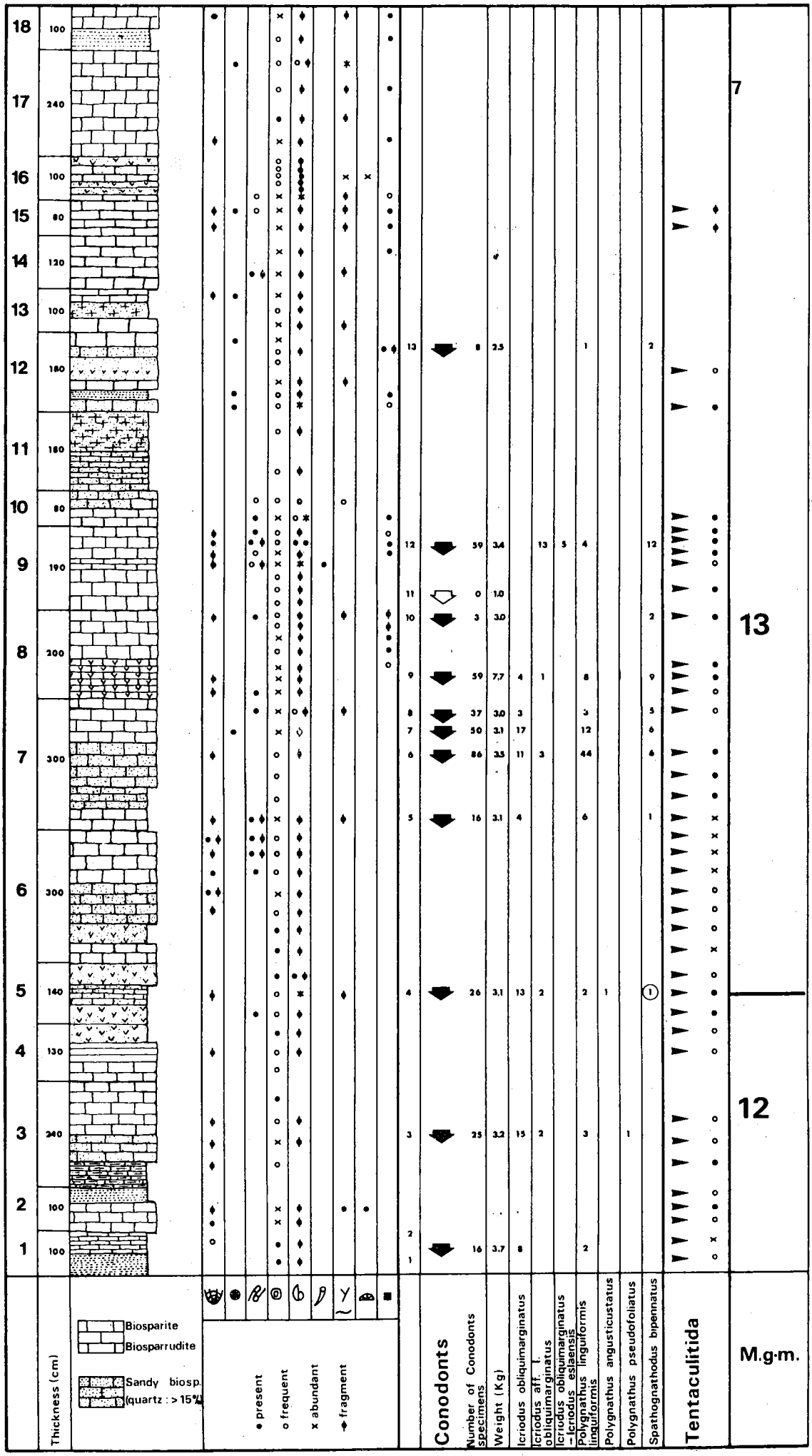
Polygnathus xylus
Polygnathus varcus
Polygnathus dubius
Polygnathus pennatus
Polygnathus timorensis
Polygnathus aff. P. norrisi
Spathognathodus insitus
Spathognathodus sannemanni
Schmidtognathus hermanni
Ancyrodella rotundiloba binodosa
Ancyrodella cf. rotundiloba
M.g.m.
16
17
18
19

MARENNE E ⑦ (M.g-m.12-13)



MENIL

E ⑧a (M.g-m.12-13)

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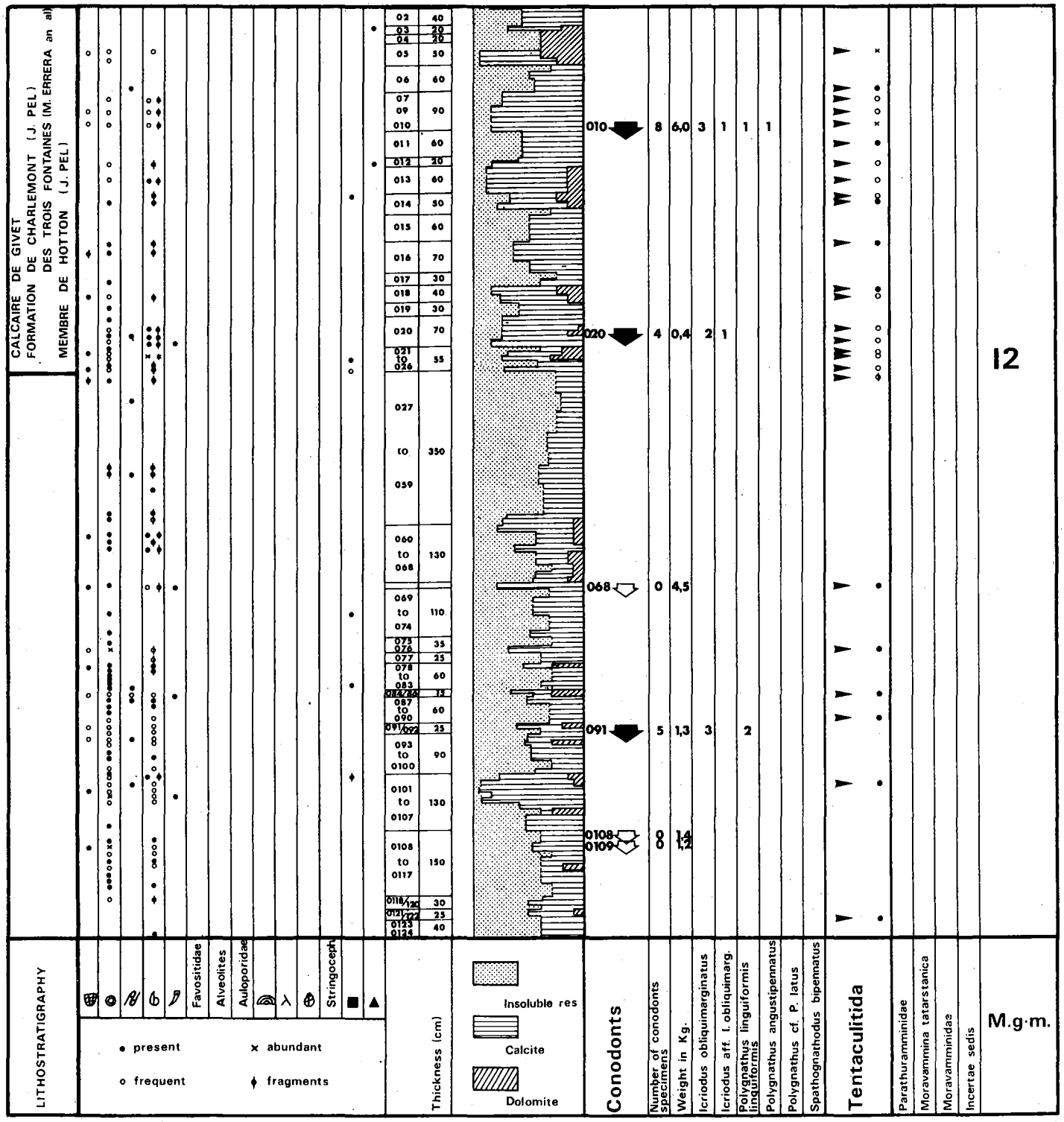

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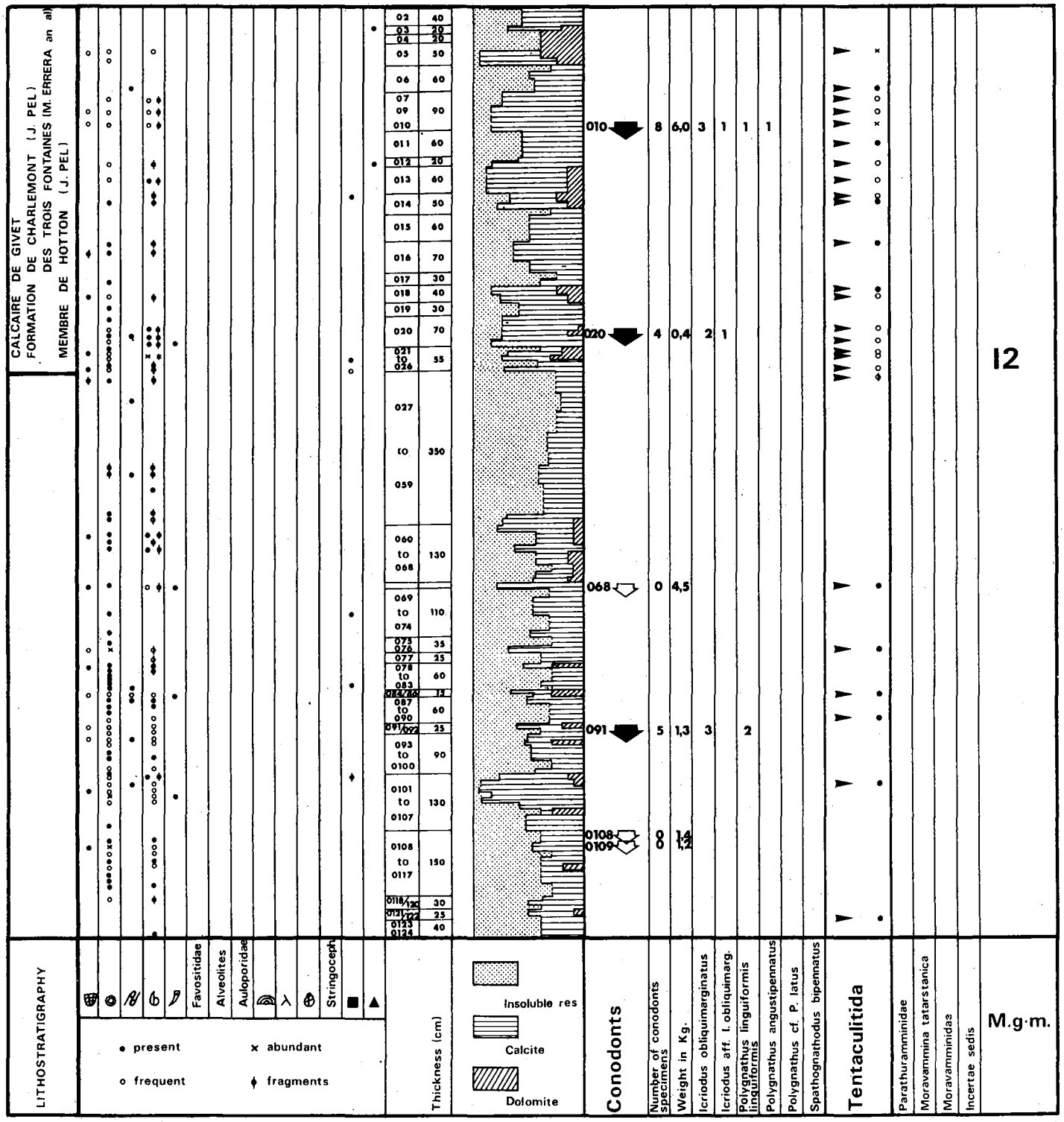
M. JARNAZ, 1969, Bull. Cl. Sciences Acad. roy. Belg. 5e serie T.LV, p.1023-24



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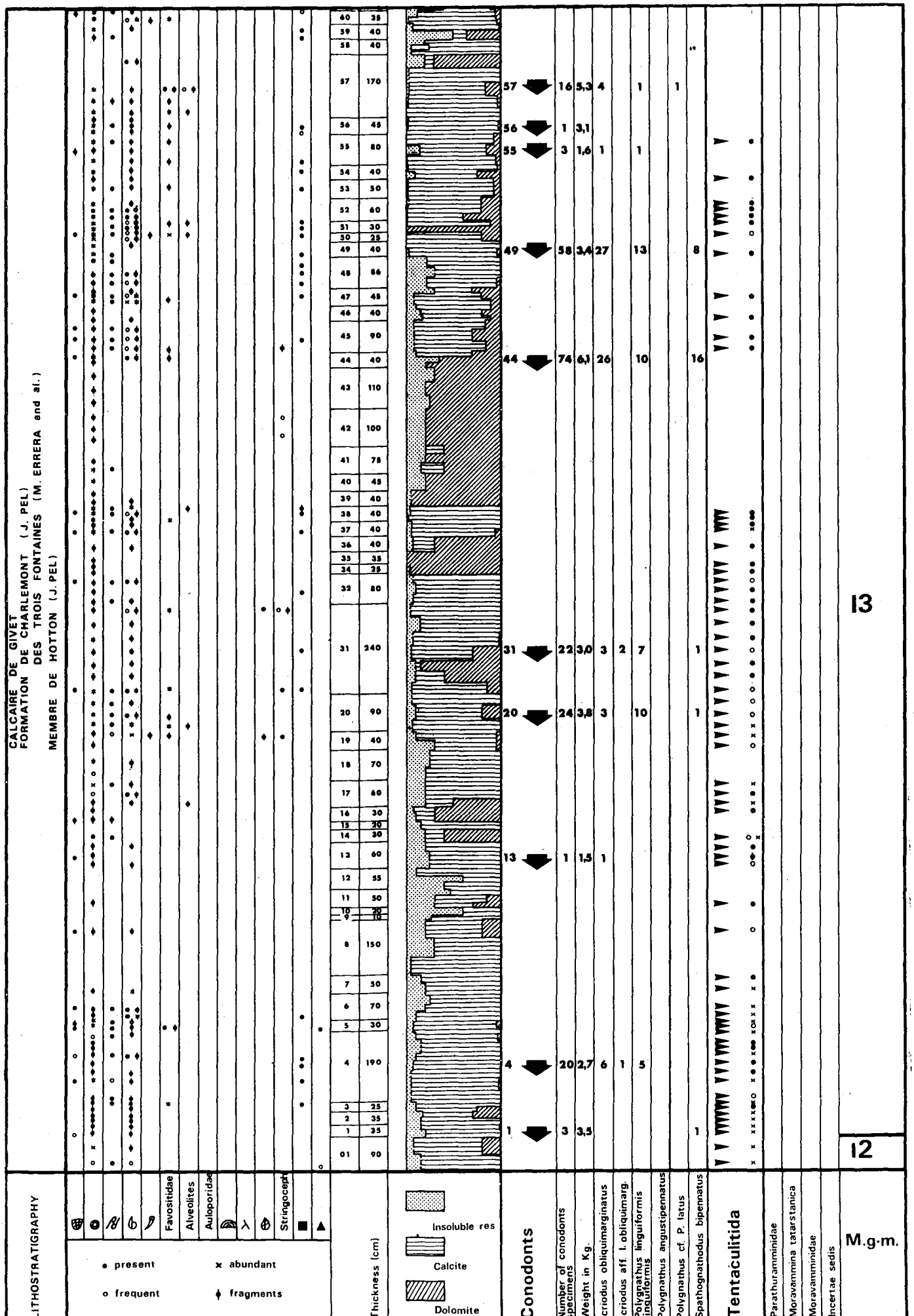

MENIL

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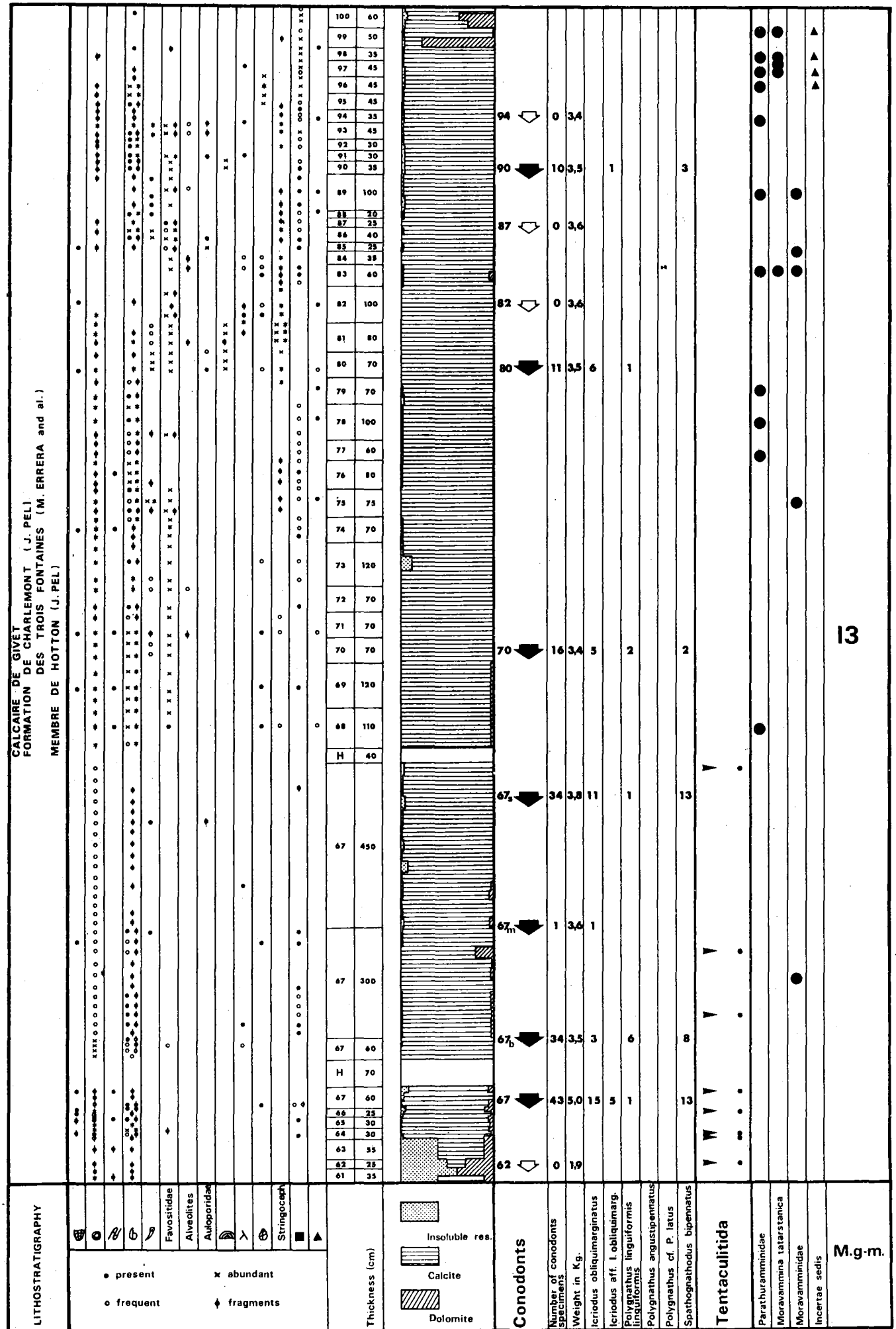

J. PEL 1961 Bull. Sc. Acad. roy. Belg. (Cl. Sciences)
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J. PEL 1965 Ann. Soc. Géol. Belg.
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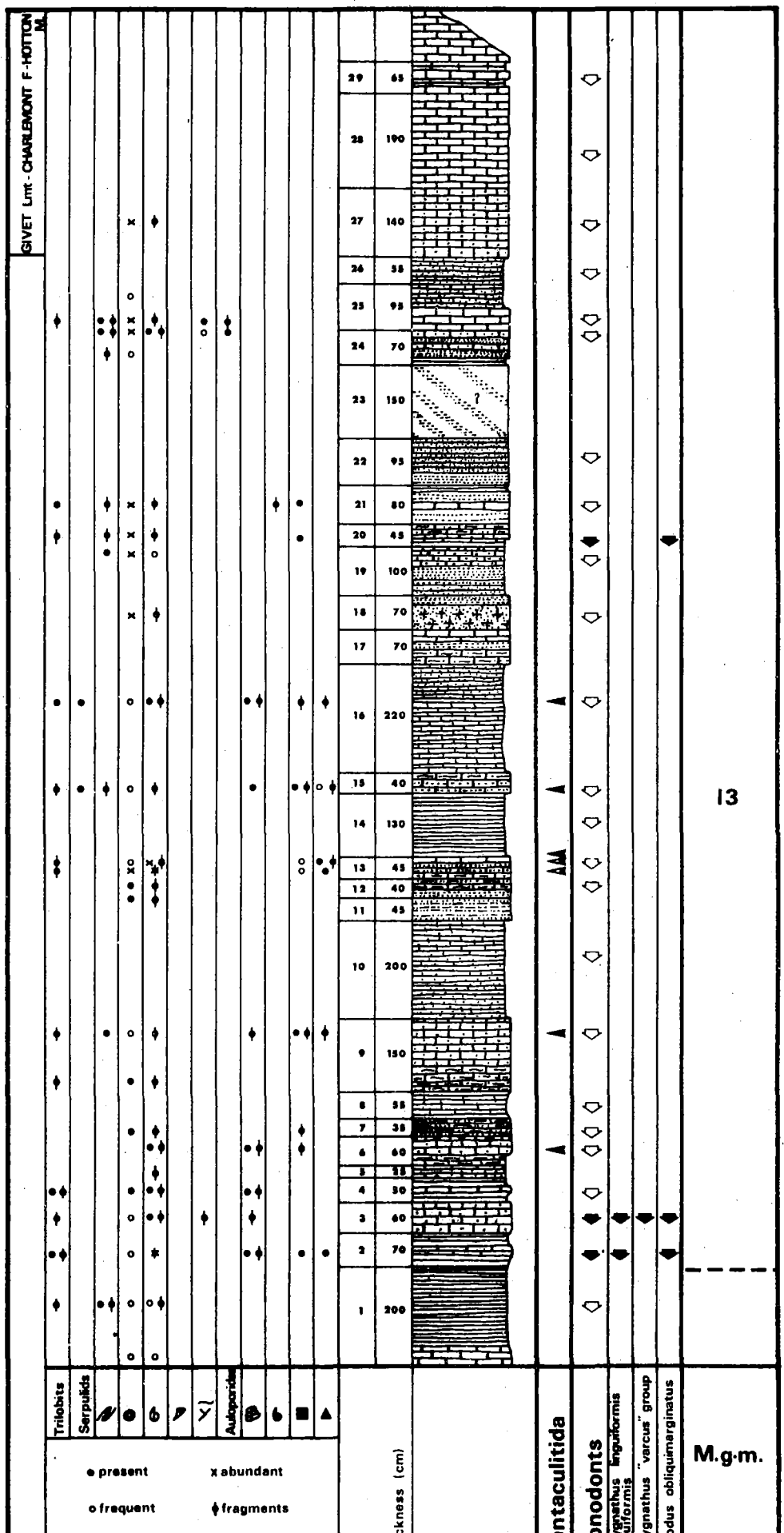
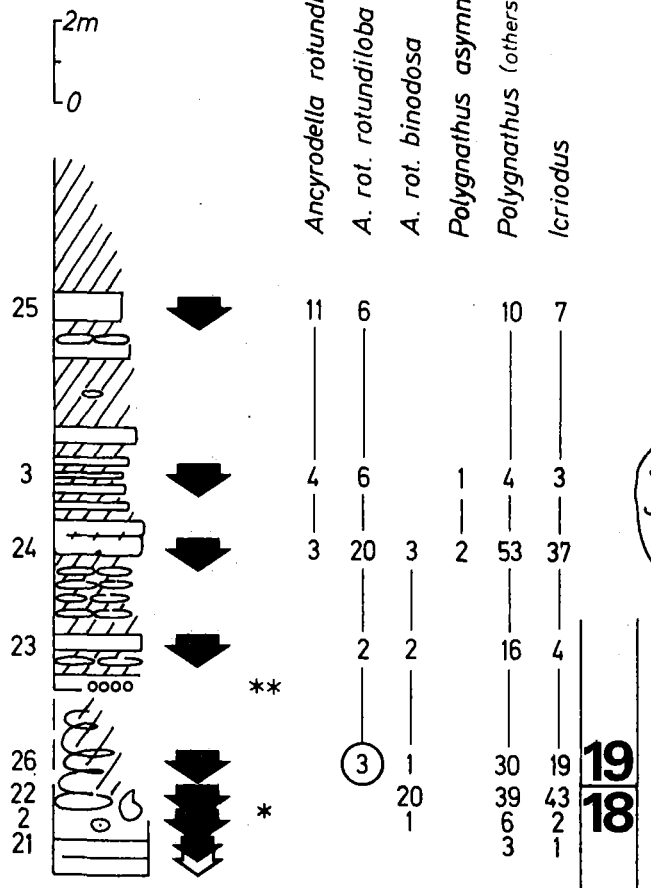
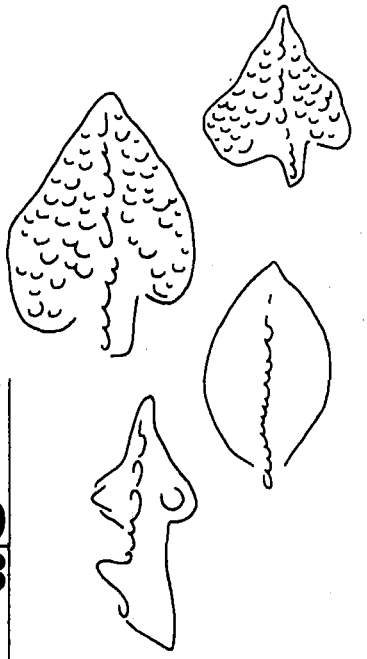
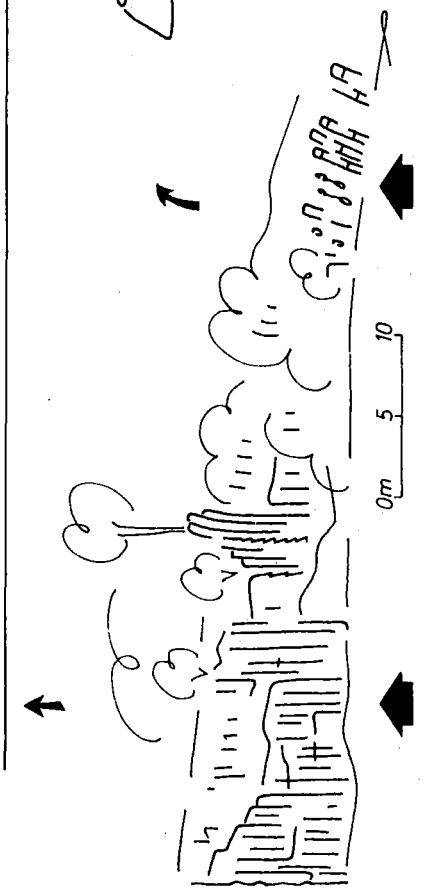


NY

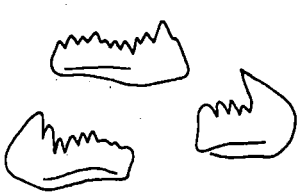
E ⑩ M. g-m. 17-19



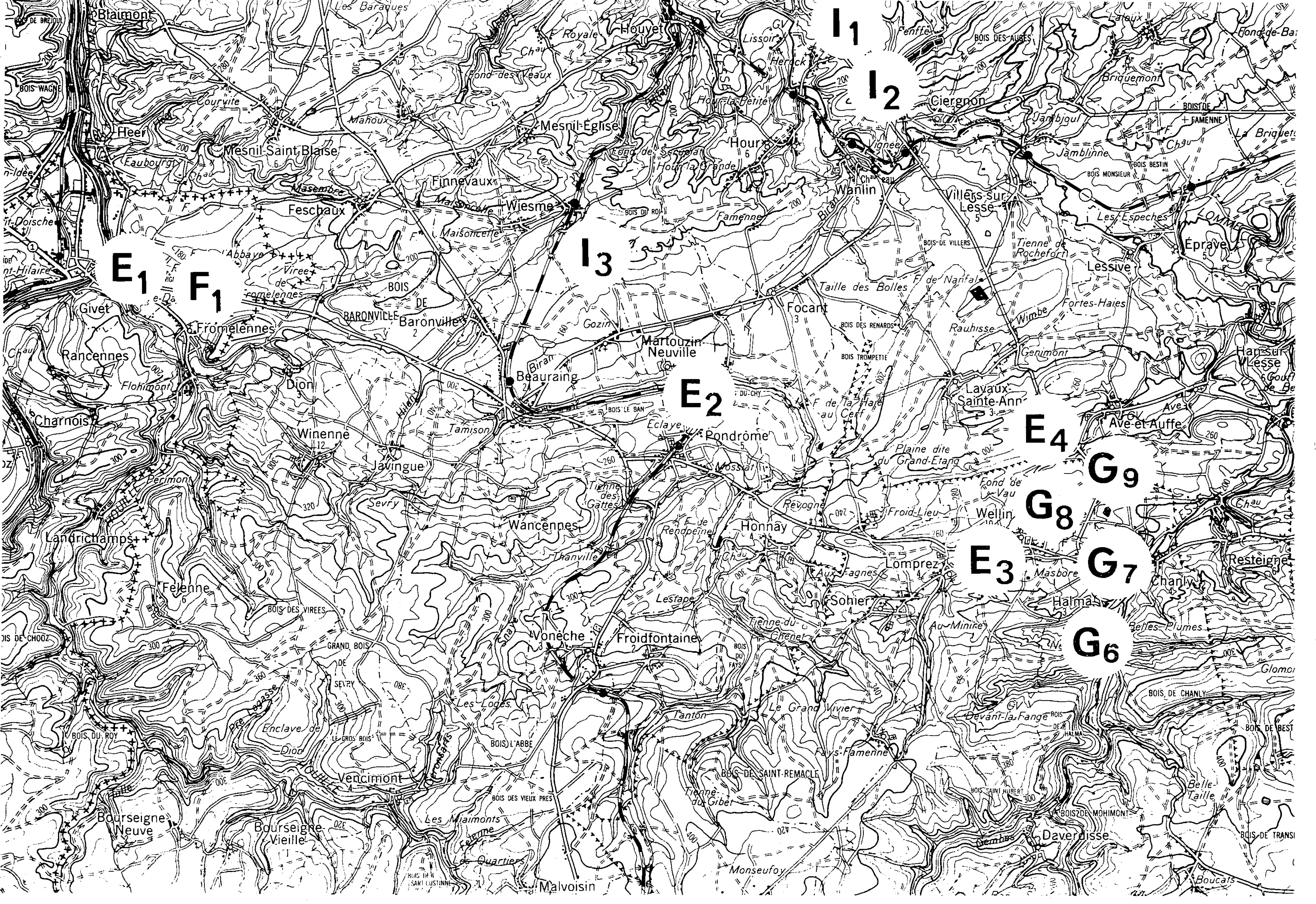




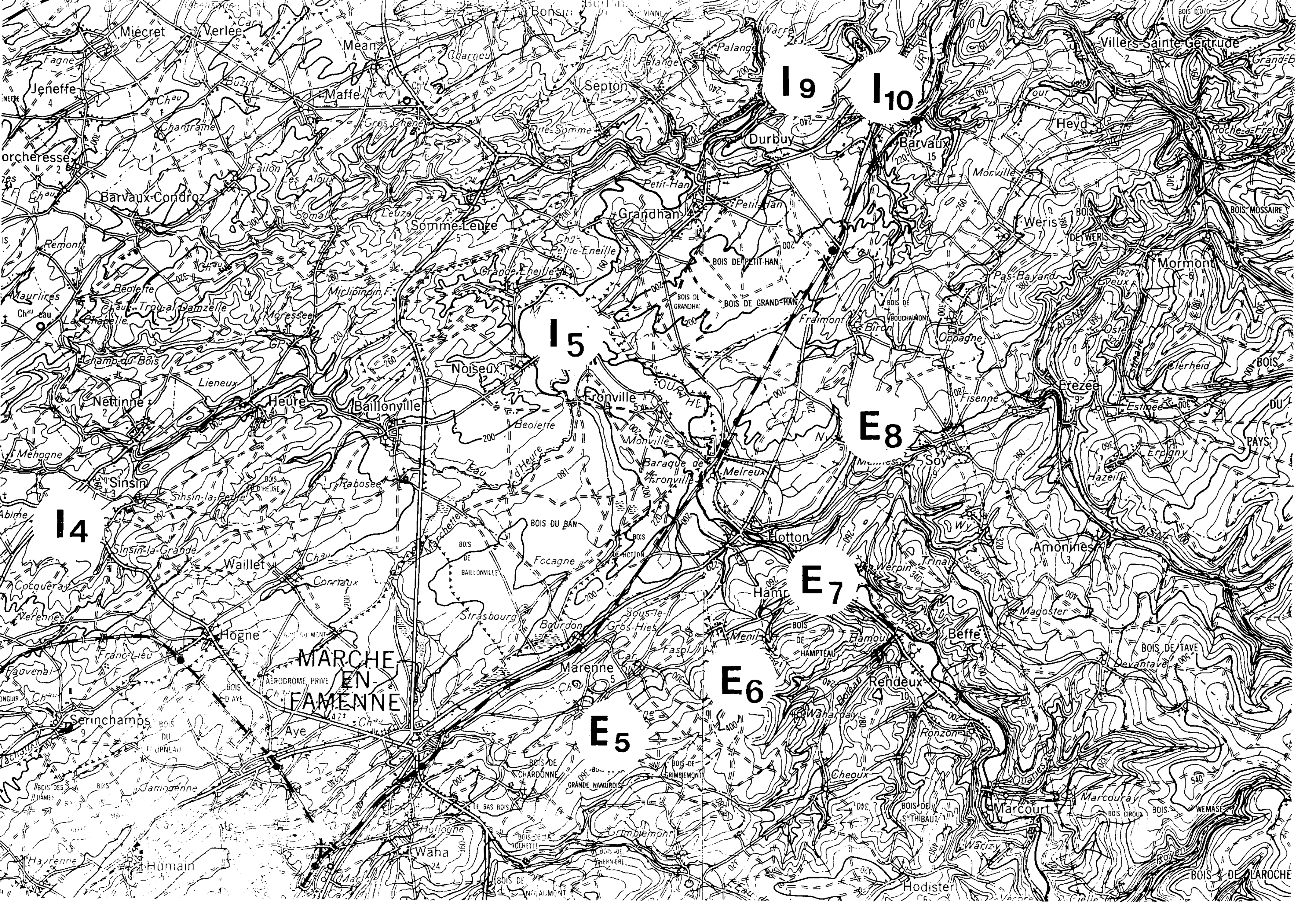
Spathognathodus insitus fauna



more than 60 specimens



E1
F1
E2
E3
E4
G6
G7
G8
G9
I1
I2
I3
Blaimont
Givet
Heer
Mesnil-Saint-Blaise
Mesnil-Eglise
Houyet
Fromelennes
Rancennes
Charnois
Landrichamps
Felenne
Feschaux
Finnevaux
Wiesme
Beauraing
Dion
Winenne
Javingue
Baronville
Martouzin-Neuville
Focant
Pondrôme
Wancennes
Vonêche
Froidfontaine
Honnay
Lomprez
Sohier
Wellin
Halma
Chanly
Resteigne
Ave-et-Auffe
Lavaux-Sainte-Anne
Lessive
Eprave
Villers-sur-Lesse
Wanlin
Hour
Ciergnon
Vencimont
Bourseigne-Neuve
Bourseigne-Vieille
Malvoisin
Daverdisse


I9
I10
I5
I4
E8
E7
E6
E5
Miecret
Verlée
Mean
Jeneffe
Maffe
Septon
Durbuy
Barvaux
Heyd
Villers-Sainte-Gertrude
Barvaux-Condroz
Somme-Leuze
Grandhan
Petit-Han
Weris
Mormont
BOIS DE PETIT-HAN
BOIS DE GRAND-HAN
Noiseux
Fronville
Heure
Baillonville
Nettinne
Sinsin
Erezée
Soy
Melreux
Hotton
Amonines
BOIS DU BAN
Waillet
Hogne
MARCHE-EN-FAMENNE
AERODROME PRIVE
Marenne
Rendeux
Beffe
Marcourt
Serinchamps
Aye
Waha
Humain
Hodister
OURTHE
AISNE

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13 Jennerstreet - 1040 Brussels - Belgium

INTERNATIONAL SYMPOSIUM ON

NAMUR 1974

BELGIAN MICROPALEONTOLOGICAL LIMITS

FROM EMSIAN TO VISEAN – SEPTEMBER 1st to 10th

EXCURSION F

Guide :

MOURAVIEFF A.

GUIDEBOOK

Edited by

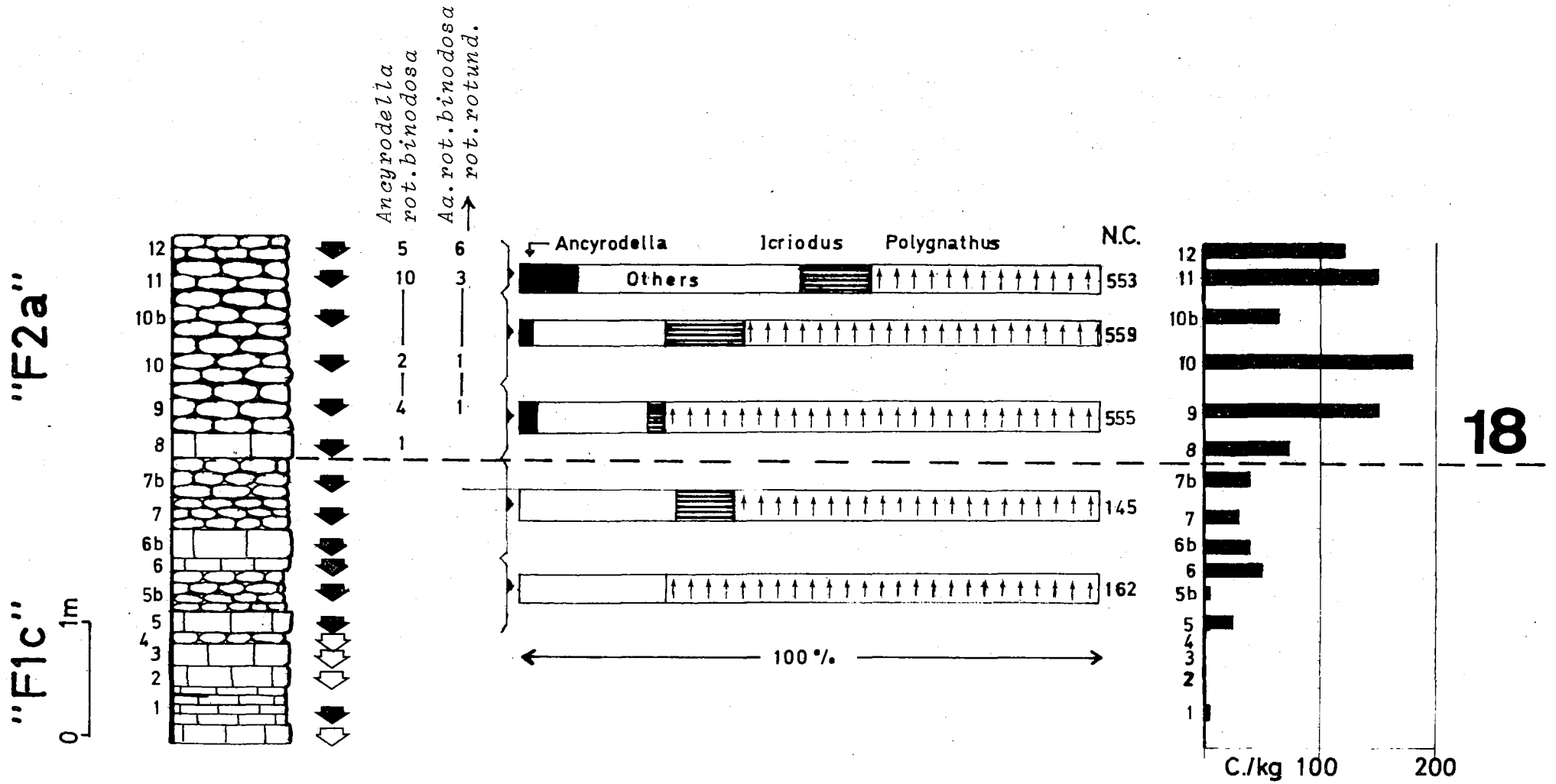
J. BOUCKAERT & M. STREEL

FROMELENNES

F①(M.g.m.17-18)

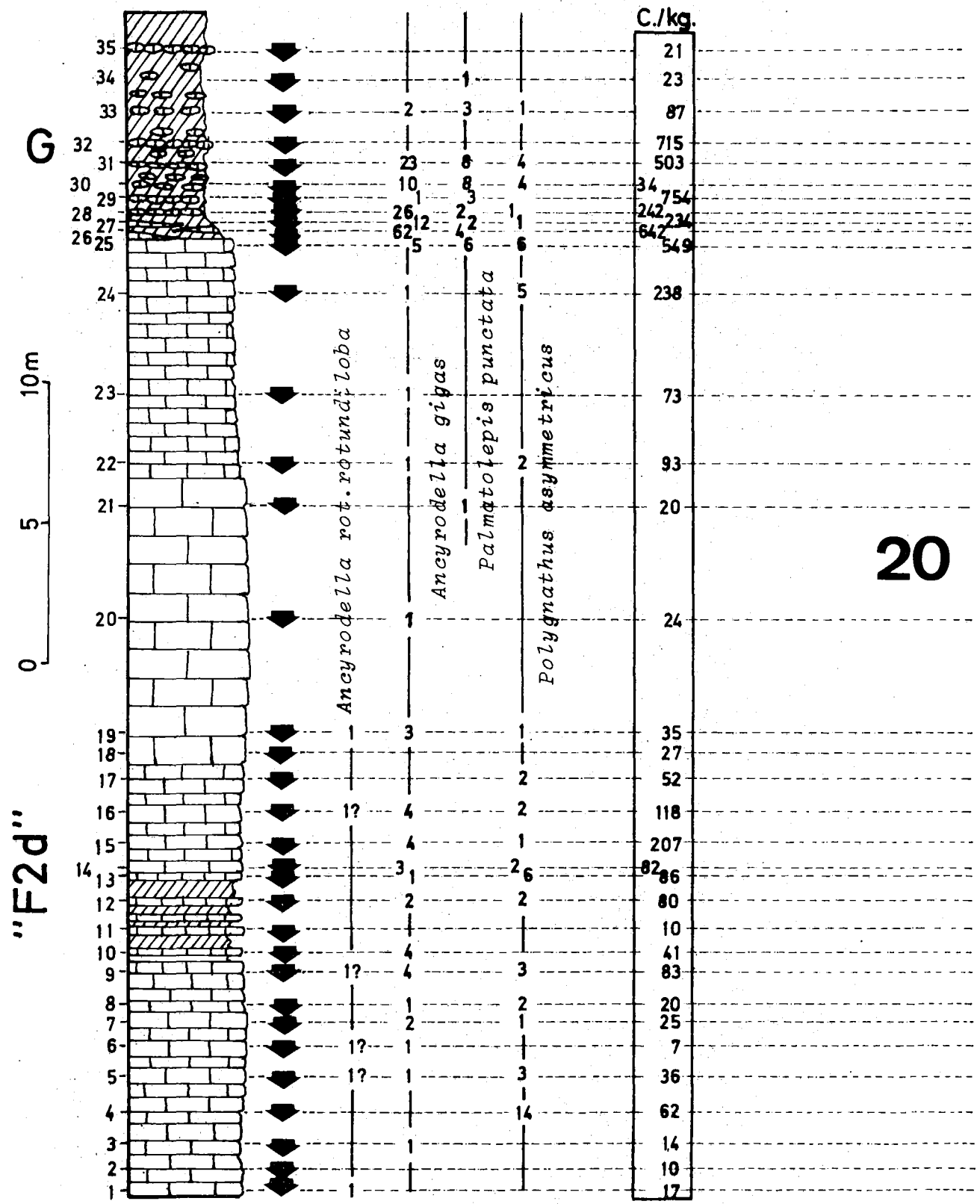
LECOMPTE, M. - Ann.Soc.géol.Belg.,T.83, pp.1-134, 1960.

COEN, M. & COEN-AUBERT, M. - Ann.Soc.Géol.Belg.,T.94,fasc.1, p.5-20, 1971.



NISMES F②(M.g.m.20)

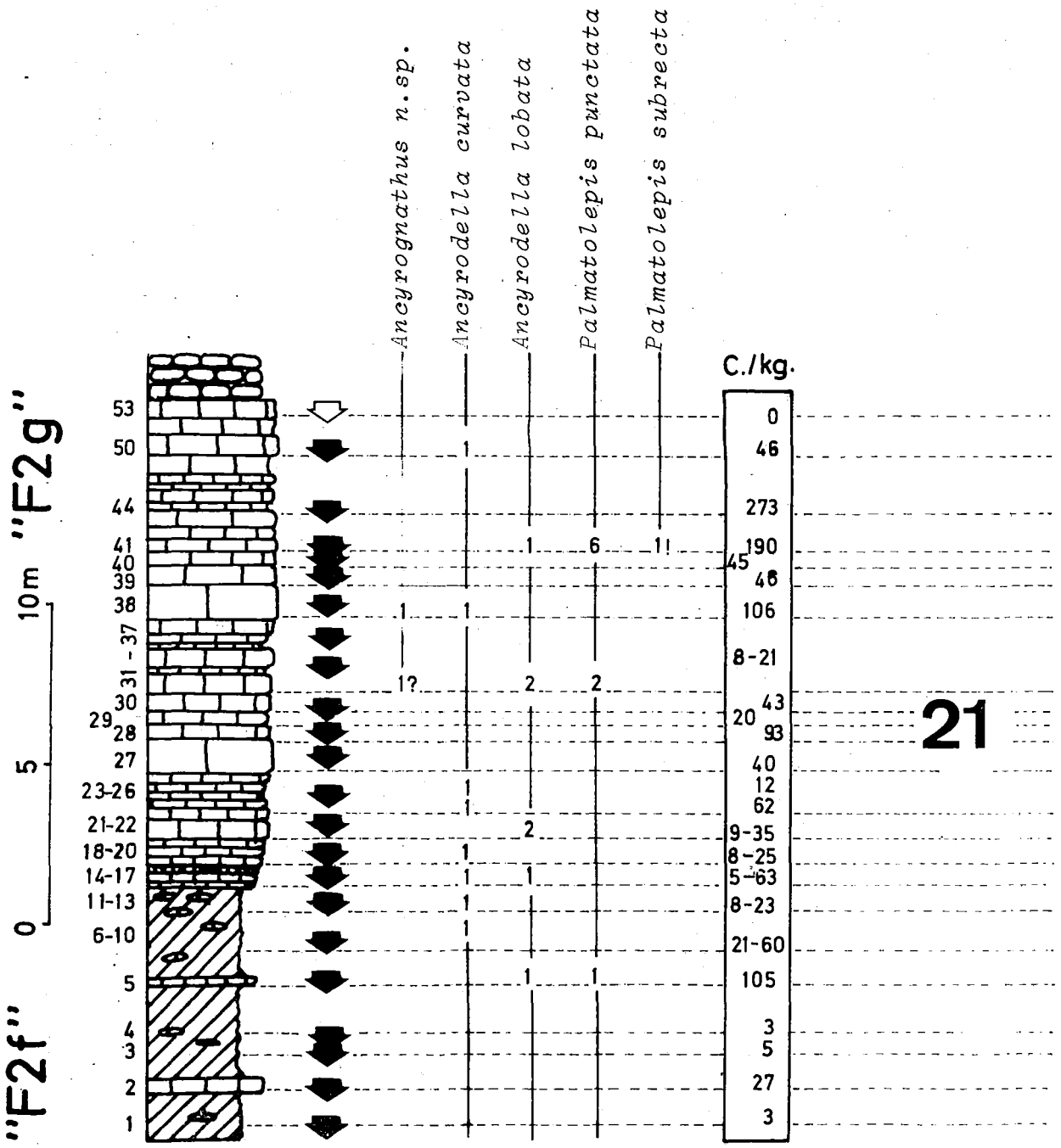
MOURAVIEFF, A. & BOUCKAERT, J. - Geologica et Paleontologica Bd.7, S.93-95, 1973.



FRASNES F③(M.g.m.21)

Railway section

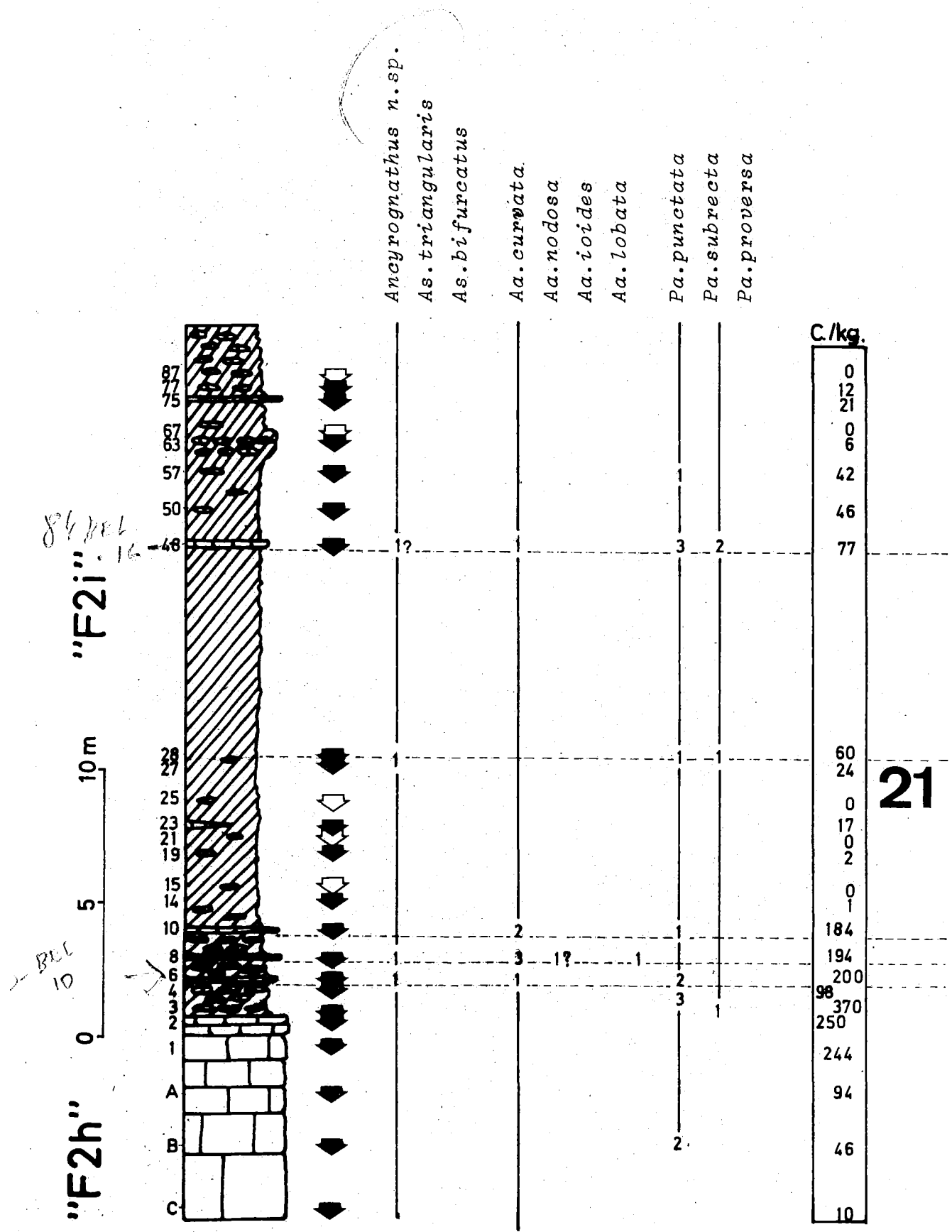
LECOMPTE, M. - 6ème Congrès Intern.Sédimentologie, Hollande-Belgique. Livret-guide excursions C et D - 1963.



FRASNES

F① a (M.g.m.21)

Acces to the Lion quarry

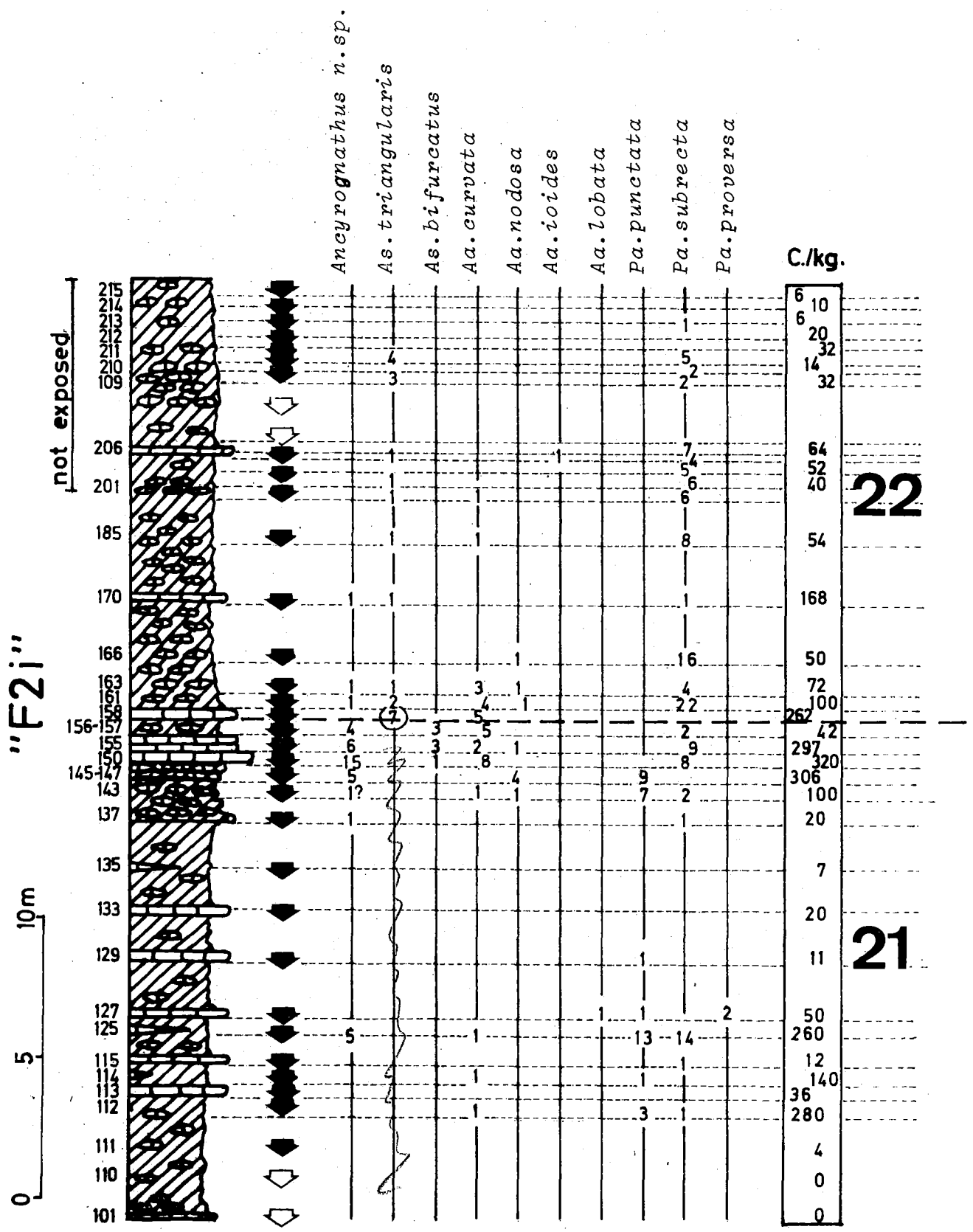


FRASNES

F⊙b(M.g.m.21-22)

Acces to the Lion quarry

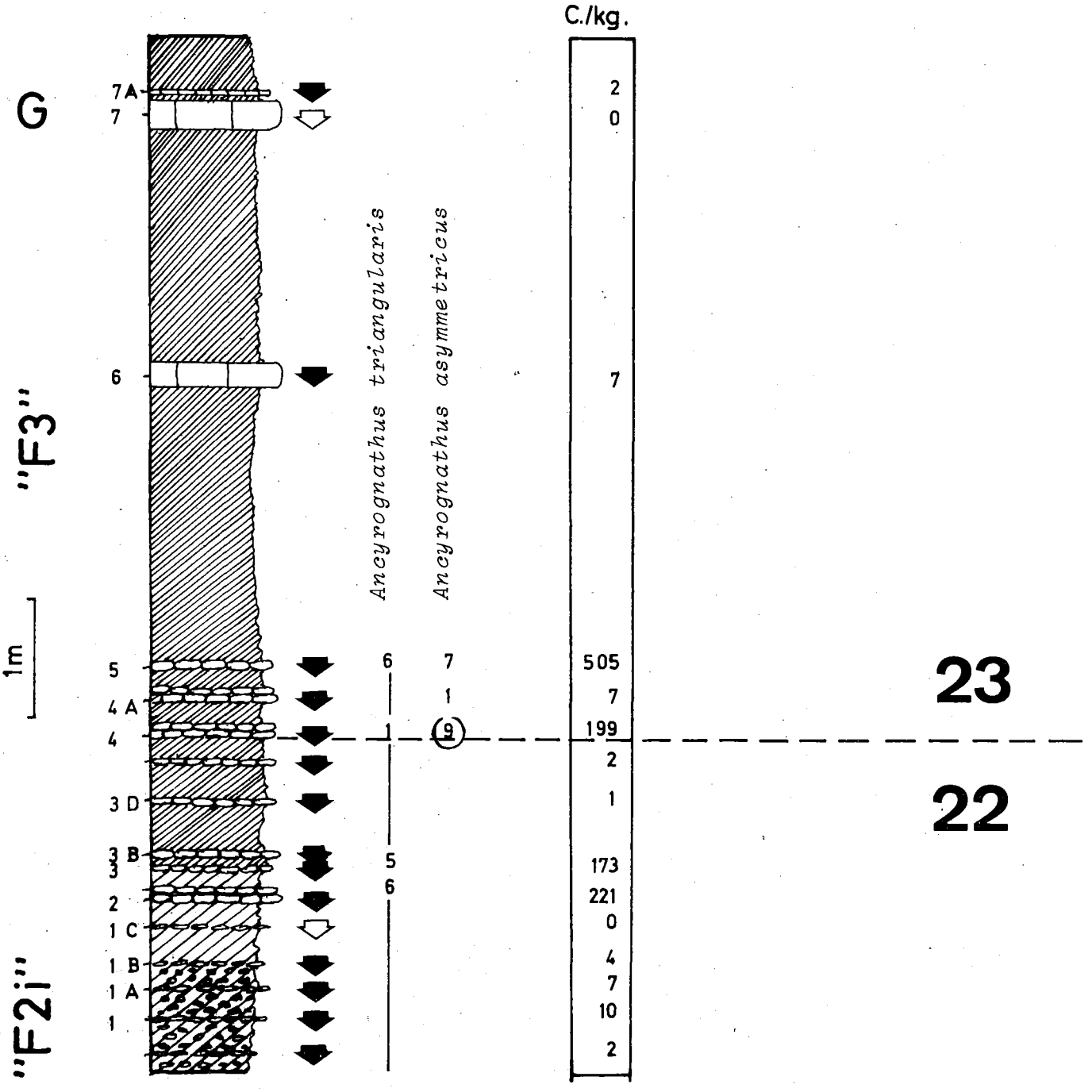
LECOMPTE, M. - Geologica et Paleontologica - Bd.4, S.25-71, 1970.



FRASNES

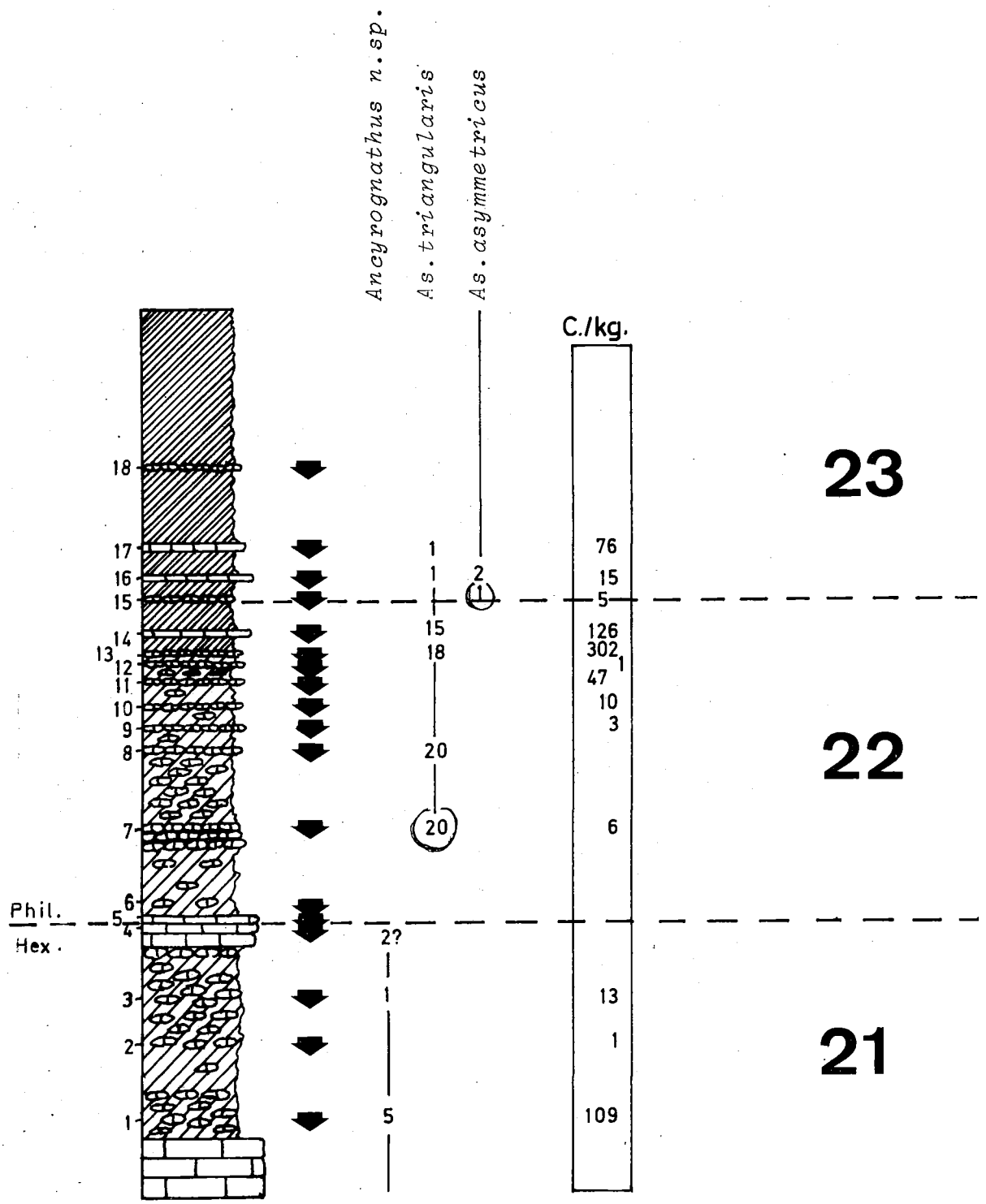
F ⑤ (M.g.m.22-23)

Road to Mariembourg



NEUVILLE F⑥ (M.g.m.21-22-23)

BOUCKAERT, J., MOURAVIEFF, N. & BLYSKOWSKA, E. - 1970.

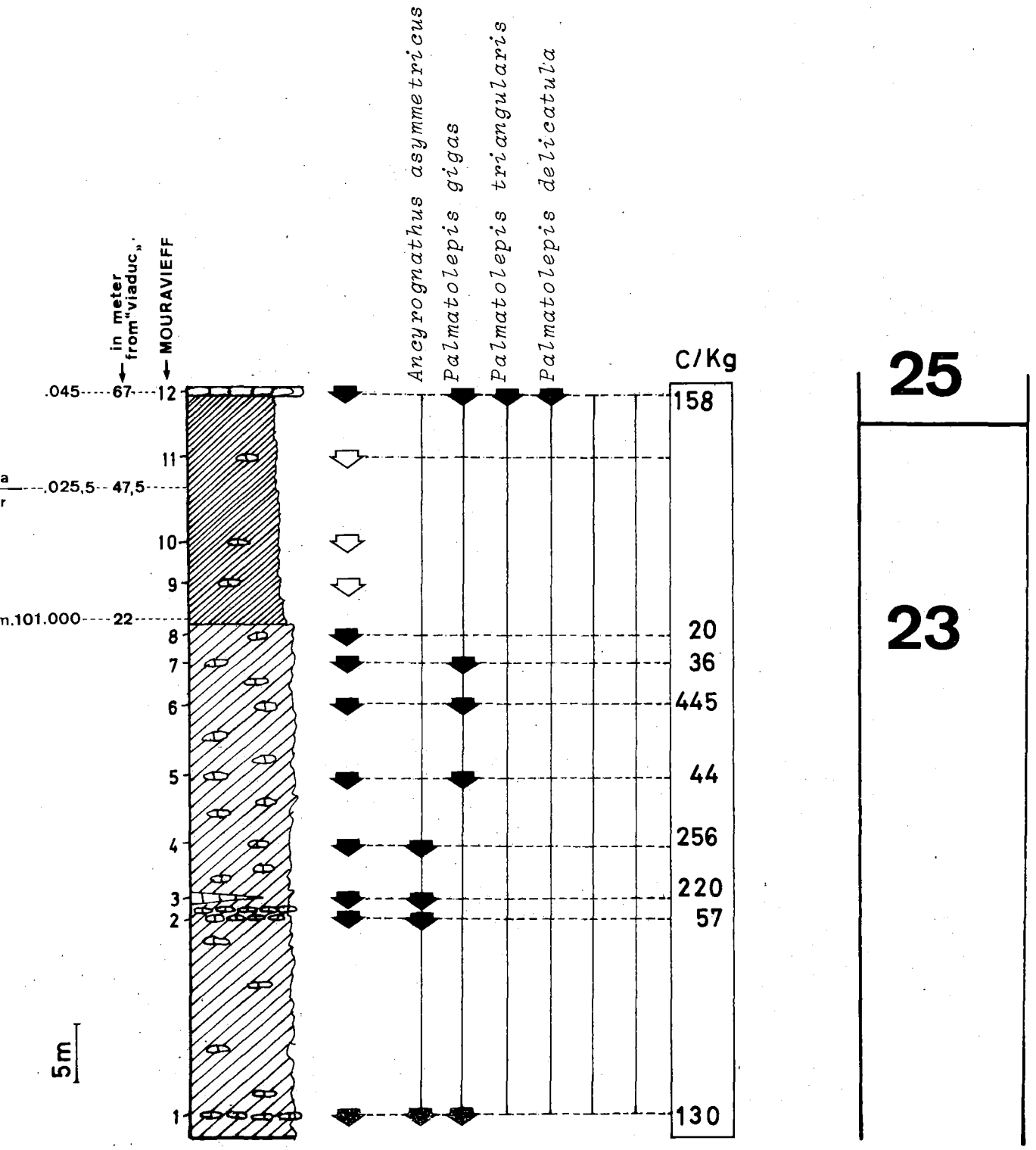


SENZEILLES. F⑦a (Mgm. 23-25)

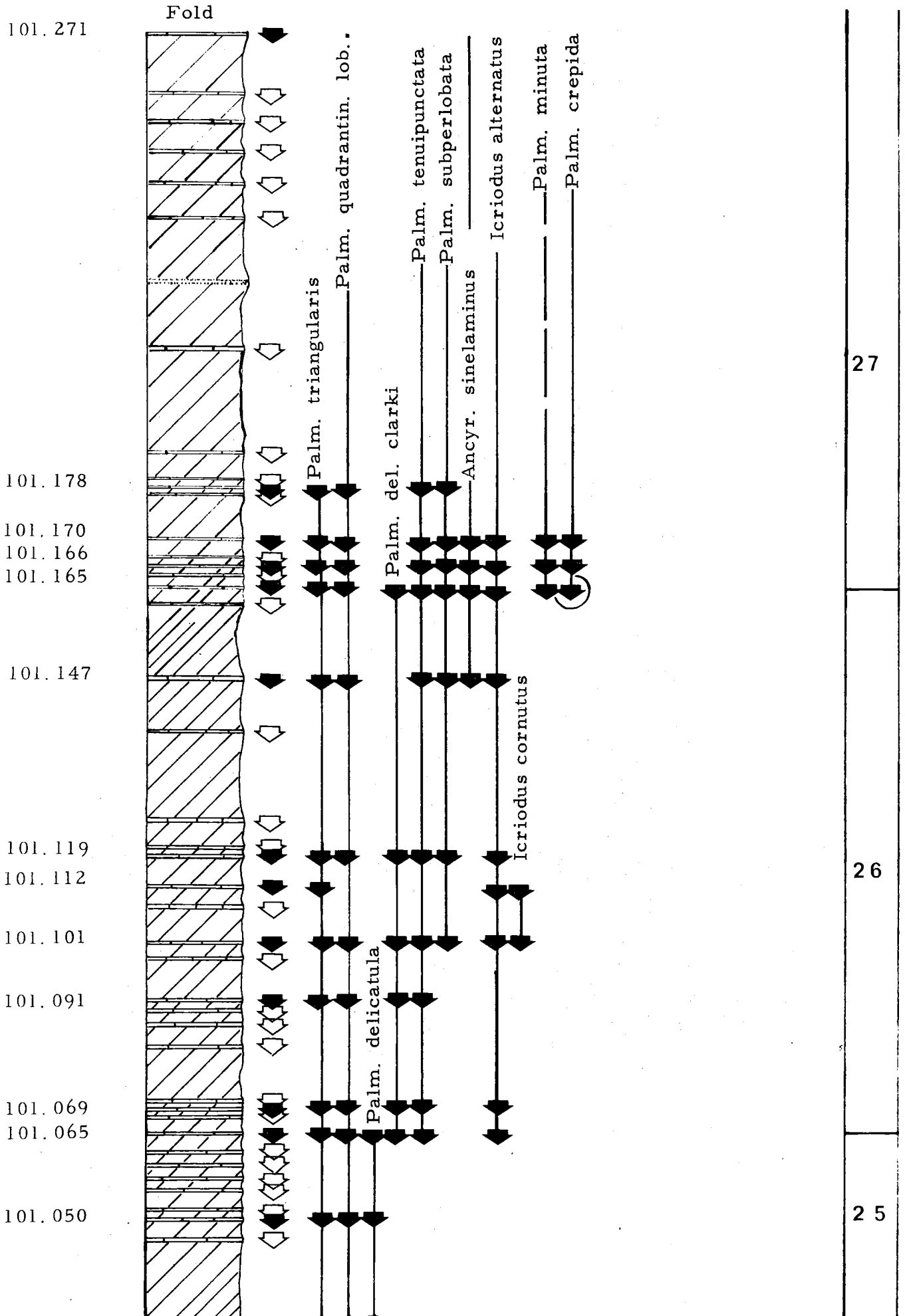
SARTENAER, 1960

BOUCKAERT & ZIEGLER, 1965

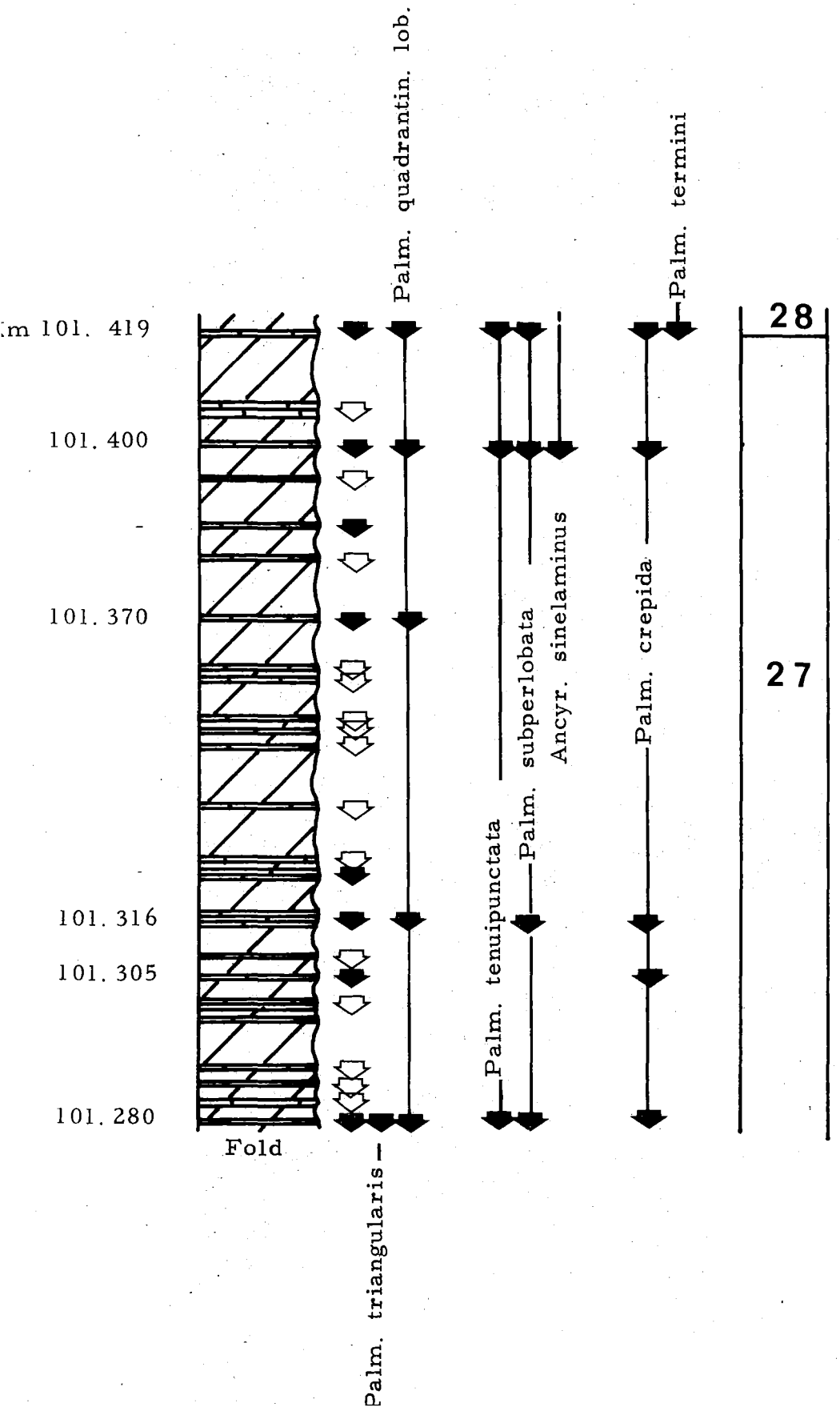
BOUCKAERT, MOURAVIEFF, STREEL, THOREZ & ZIEGLER, 1972

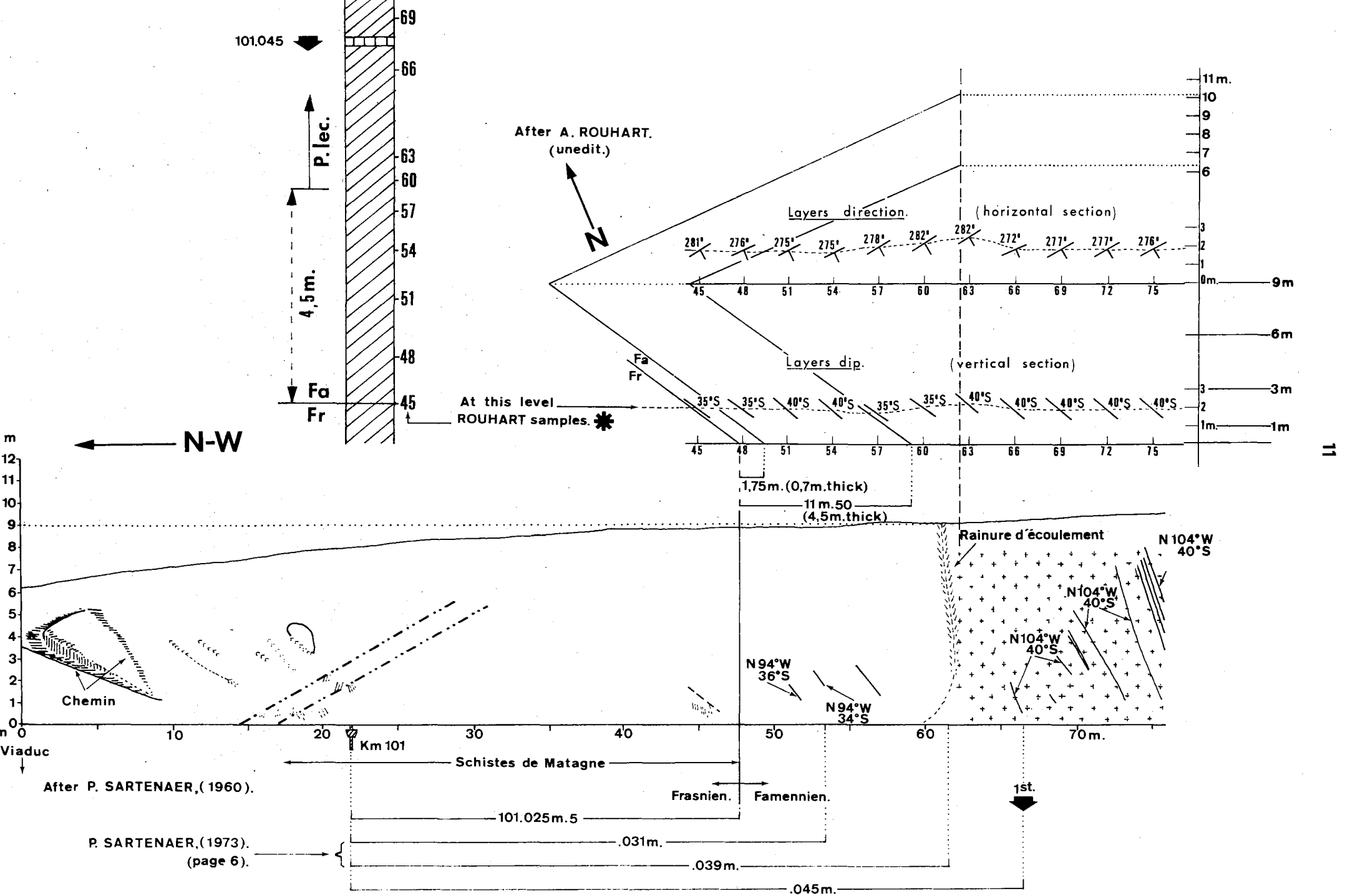


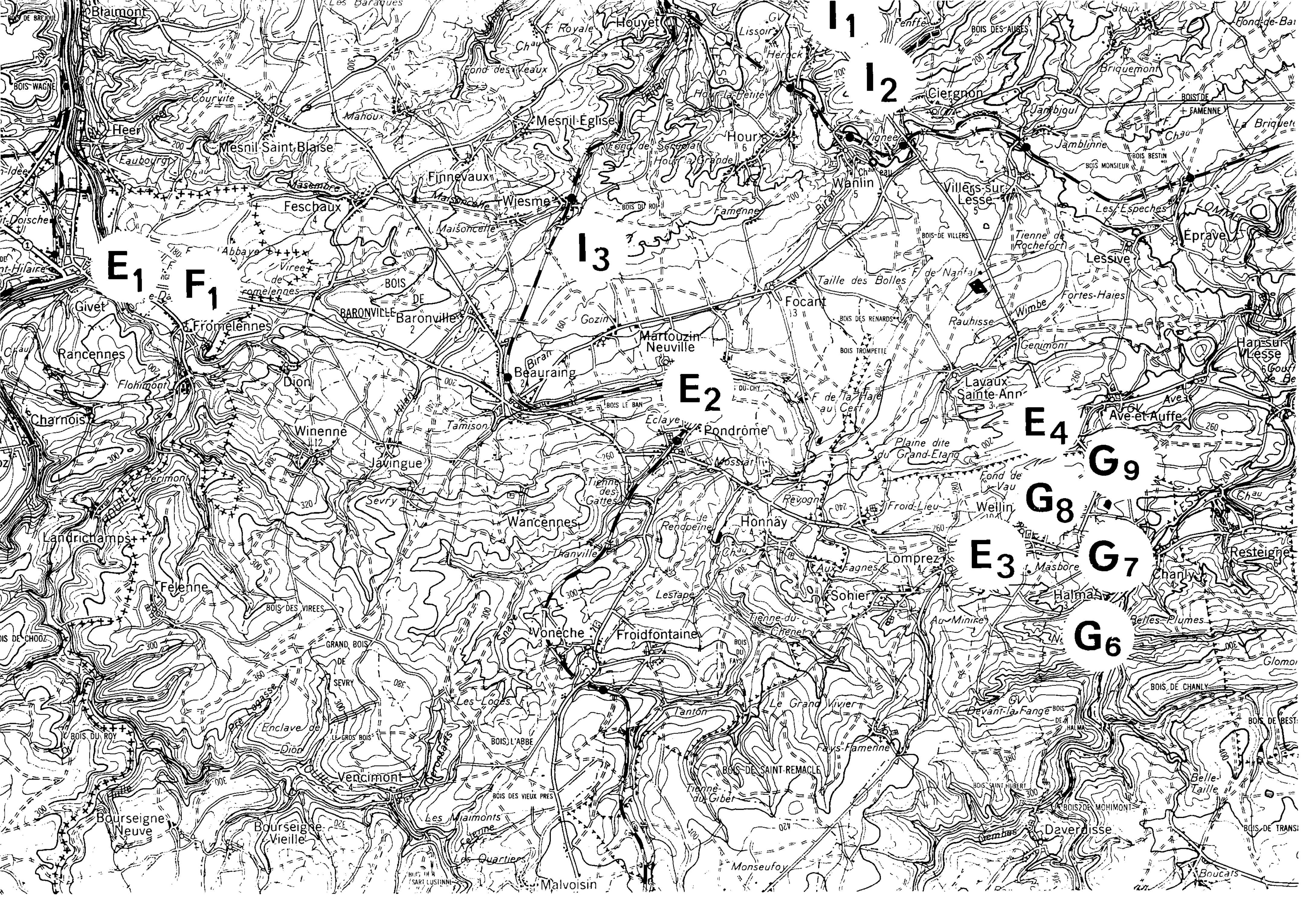
SENZEILLES F⑦b Mgm(25-27)



F⑦c Mgm(27-28)


Palm. quadrantin. lob.
Palm. termini
28
m 101. 419
101. 400
101. 370
27
Palm. subperlobata
Ancyr. sinelaminus
Palm. crepida
Palm. tenuipunctata
101. 316
101. 305
101. 280
Fold
Palm. triangularis


101.045
69
66
63
60
57
54
51
48
45
P.lec.
4,5m.
Fa
Fr
After A. ROUHART.
(unedit.)
N
Layers direction.
(horizontal section)
281° 276° 275° 275° 278° 282° 282° 272° 277° 277° 276°
45 48 51 54 57 60 63 66 69 72 75
11m.
10
9
8
7
6
3
2
1
0m.
9m
6m
3m
1m.
1m
Layers dip.
(vertical section)
35°S 35°S 40°S 40°S 35°S 35°S 40°S 40°S 40°S 40°S 40°S
At this level
ROUHART samples.
N-W
1,75m. (0,7m.thick)
11m.50
(4,5m.thick)
Rainure d'écoulement
N 104°W
40°S
N104°W
40°S
N104°W
40°S
N94°W
36°S
N94°W
34°S
Chemin
Viaduc
Km 101
Schistes de Matagne
Frasnien.
Famennien.
1st.
After P. SARTENAER,(1960).
101.025m.5
P. SARTENAER,(1973).
(page 6).
.031m.
.039m.
.045m.



I1
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F1
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E3
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G6
G7
G8
G9
Blaimont
Houyet
Lissoir
Ciergnon
Heer
Mesnil-Saint-Blaise
Mesnil-Eglise
Hour
Finnevaux
Feschaux
Wiesme
Wanlin
Villers-sur-Lesse
Eprave
Lessive
Givet
Fromelennes
Baronville
Focant
Rancennes
Dion
Beauraing
Martouzin-Neuville
Han-sur-Lesse
Lavaux-Sainte-Anne
Ave-et-Auffe
Charnois
Winenne
Pondrôme
Javingue
Wancennes
Honnay
Wellin
Landrichamps
Felenne
Lomprez
Halma
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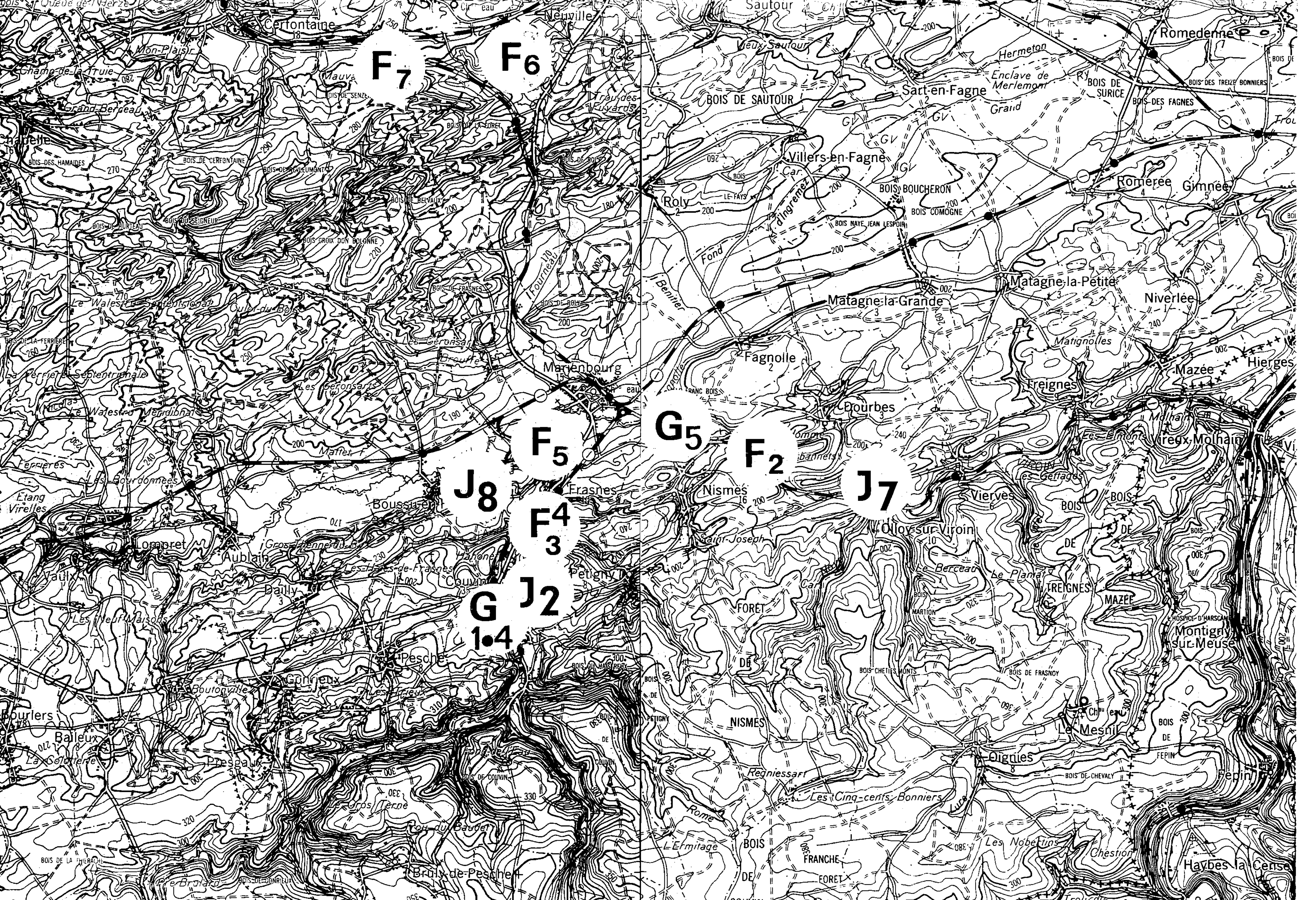
Vencimont
Bourseigne-Neuve
Bourseigne-Vieille
Daverdisse
Malvoisin


F7
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F3
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G5
G
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J7
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J8
Cerfontaine
Neuville
Sautour
Romedenne
Vieux Sautour
Hermeton
Sart-en-Fagne
Enclave de Merlemont
BOIS DE SAUTOUR
BOIS DE SURICE
BOIS DES FAGNES
Villers-en-Fagne
BOIS BOUCHERON
BOIS COMOGNE
Romerée
Gimnée
Roly
Matagne-la-Petite
Matagne-la-Grande
Niverlée
Fagnolle
Mariembourg
Mazée
Hierges
Treignes
Dourbes
Nismes
Vierves
Olloy-sur-Viroin
Frasnes
Boussu-en-Fagne
Couvin
Petigny
Pesche
Gonrieux
Aublain
Dailly
Lompret
Vaulx
Virelles
Chapelle
Mon-Plaisir
Grand Bergeau
Bourlers
Baileux
Presgaux
Brûly-de-Pesche
Saint-Joseph
FORÊT DE NISMES
BOIS DE FRASNOY
TREIGNES
MAZÉE
Montigny-sur-Meuse
Le Mesnil
Oignies
Fépin
Regniessart
Les Cinq-cents-Bonniers
L'Ermitage
BOIS FRANCHE FORÊT
Haybes
La Censé

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NAMUR 1974

BELGIAN MICROPALEONTOLOGICAL LIMITS

FROM EMSIAN TO VISEAN – SEPTEMBER 1st to 10th

EXCURSION G

Guides :

BULTYNCK P. (leader)

GODEFROID T.

GUIDEBOOK

Edited by

J. BOUCKAERT & M. STREEL

COUVIN - Eau Noire G(1) a - e

This section along the Eau Noire river, is 1200 m S of the town. The first description of the outcrop was by F.A. ROEMER in 1850 (pp. 87 - 89) and it was later described by J. GOSSELET (1860, pp. 43 - 51, p. 151, pl. III, fig. 13 and 14).

On sheet G (1) a only the upper part of the Upper Emsian (Formation 1) is figured and it comprises sandy shales, sandstones and siltstones with regular intercalations of shelly beds (sandy, argillaceous coquinas or shelly and pure coquina quartz sandstones).
These form part of the "Roches noires de Hierges " (J. GOSSELET, 1868, pp. 289 - 290) which also he later called the "Grauwacke de Hierges".
The term "Assise de Hierges" with "Spirifer" paradoxus and "Spirifer" arduennensis was introduced by H. de DORLODOT (1901, p. 188), who subdivided the "Grauwacke de Hierges" biostratigraphically.

Some of the shelly beds containing a calcareous cement have produced small conodont faunas (10 specimens/Kg) with Icriodus and simple cones. The holotype of Icriodus culicellus BULTYNCK P. 1974 originates from bed 33.

A gap of 137 m seperates the top of bed 61 from the top of the lithostratigraphic unit 2 on sheet G (1) b (see also section COUVIN Béguinage, G (2)).

The top of unit 2 is marked by a argillaceous, calcareous shelly bed (5 - 6).

Formation 3, for which the name Eau Noire Formation is proposed, by the National Commission on Devonian Stratigraphy, alternates between calcareous shales and fine argillaceous limestones in the lower part and crinoïdal limestones in the upper part.

Almost every limestone bed contains conodonts (1 - 10/Kg on average but sometimes up to 100 /Kg). Beds 5 - 6, 7, 25, 32 (top), 42 and 54 have produced the best faunas. They are dominated by Icriodus.

Important is the earliest occurrence of Icriodus introlevatus and I. curvirostratus and also the first local occurrence of Polygnathus linguiformis linguiformis forma α .

The base of the Calcaire de COUVIN (J. GOSSELET, 1860, pp. 48 - 50) is marked by the first massive limestone bed. Small shaly lenses occur locally.

Member I is composed of biostromal beds. Conodonts occur regularly in small numbers (1 - 20 /Kg) and the faunas are again dominated by Icriodus. The holotype of Icriodus introlevatus BULTYNCK P. 1970 is from bed 62, those of I. retrodepressus BULTYNCK P. 1970 from bed 75/6.

Member II is composed of fine argillaceous limestones. Some of them yield rich conodont faunas (more than 100/Kg, e.g. beds 2/14 and 15). Icriodus is the most abundant genus (75 %), Polygnathus also occurs together with a few bars and simple cones. The holotype of Icriodus curvirostratus BULTYNCK P. 1970 originates from the basal part of bed 2/15.

Members III and IV are biostromal and great parts of these beds are dolomitised. Conodonts are scarce in this part of the section. Several kg samples are needed to obtain a good fauna. Between the last occurrence of Polygnathus costatus patulus (Member I, bed 75) and the first record of P. costatus costatus there is some uncertainty. Icriodus corniger disappears near the base of Member IV.

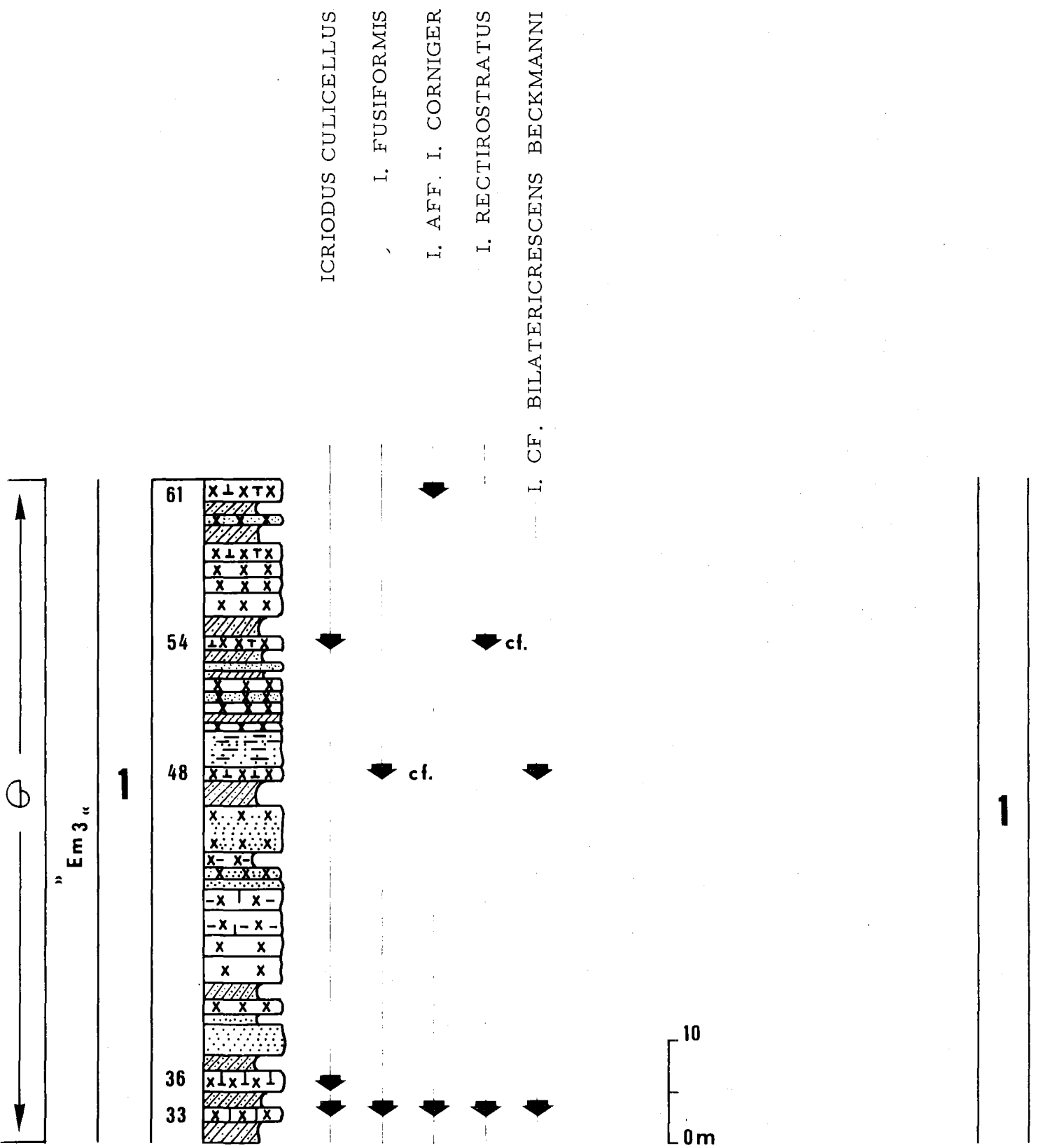
In Member V biostromal beds alternate with fine limestones which lack a significant megafauna.Conodonts are very rare. The occurrence of Spathognathodus aff. S. bipennatus is of import in this section.

Differences with S. bipennatus, occuring higher in the Givetian are minor.

Members I to IV and the basal part of Member V (up to sample 2/52) are exposed ont he left hand side; the upper part of Member V outcrops in the cliff above the cavern "Trou de l'Abîme" downtown on the right side of the Eau Noire river.

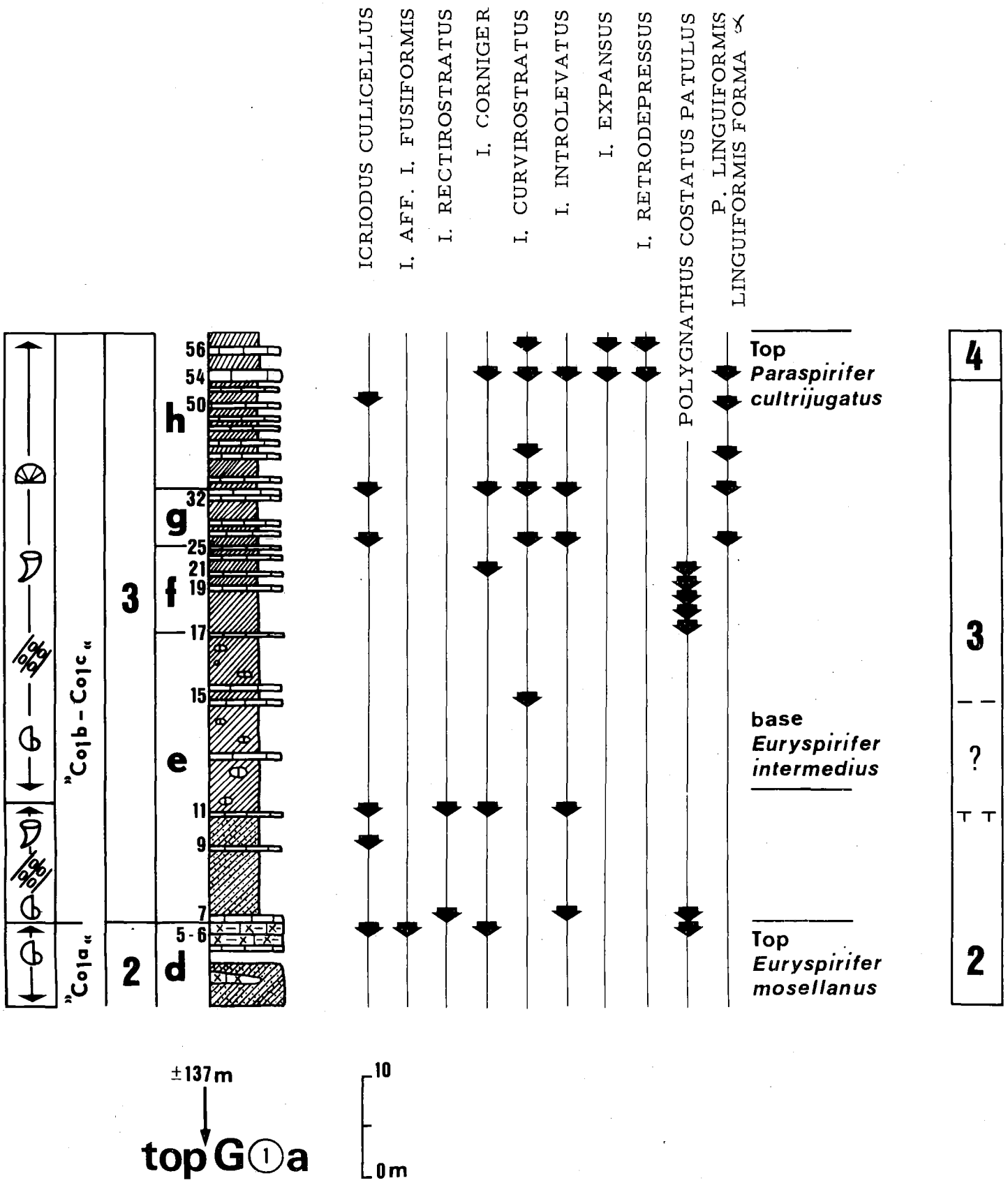
COUVIN EAU NOIRE G①a(M.g.m.1)

1970 - P. BULTYNCK , Mém. Inst. Géol. Univ. Louvain, 26, p. 19, pl. 35.



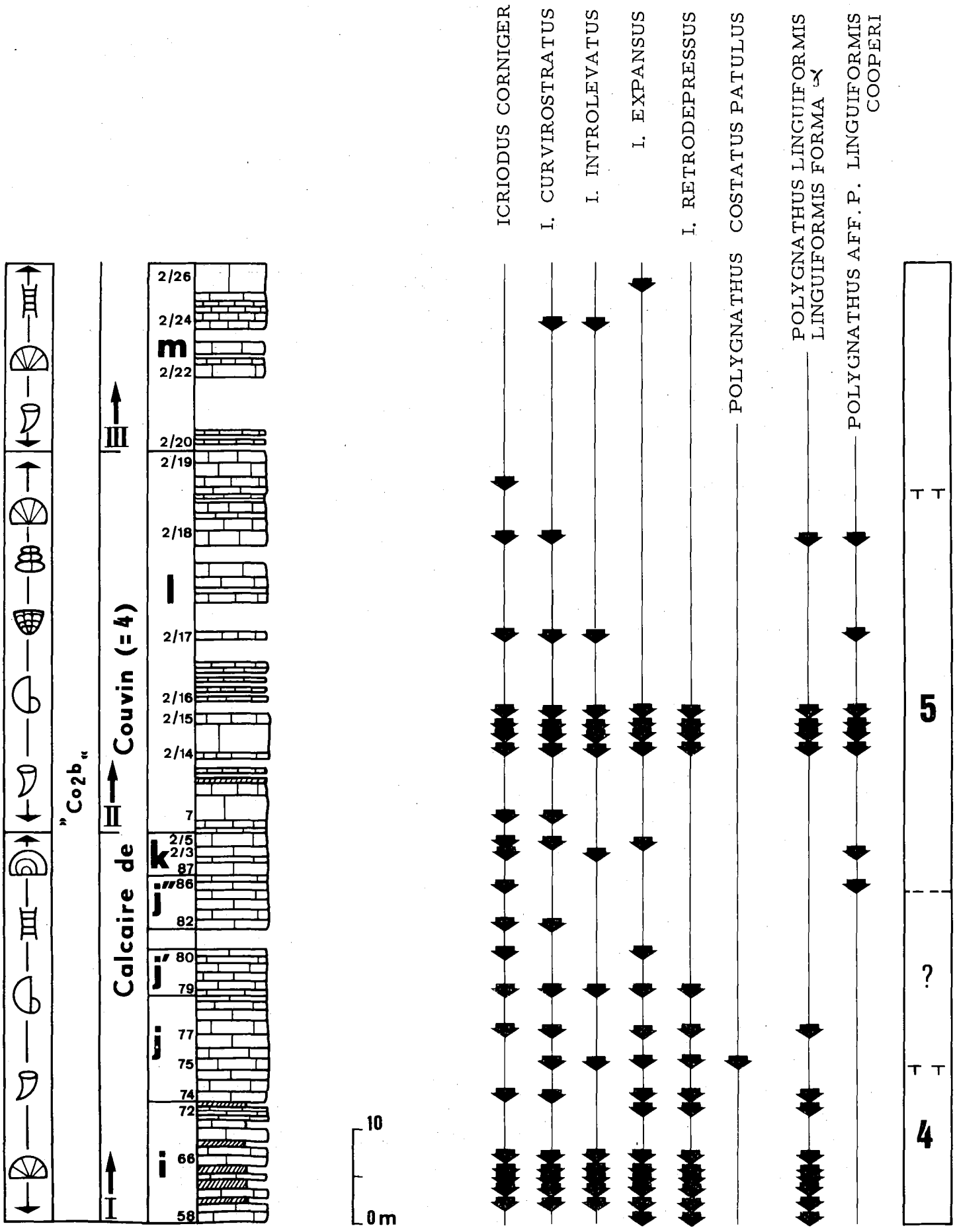
COUVIN EAU NOIRE G①b(M.g.m.2-4)

1960 - M. LECOMPTE, A.S.G.B., 83, p. 31 - 34, fig. 4.
1969 - H.H. TSIEN , Mém. Inst. Géol. Univ. Louvain, 25, p. 11 - 12, pl. 4.
1970 - P. BULTYNCK, Mém. Inst. Géol. Univ. Louvain, 26, p. 24 - 27, pl. 35.



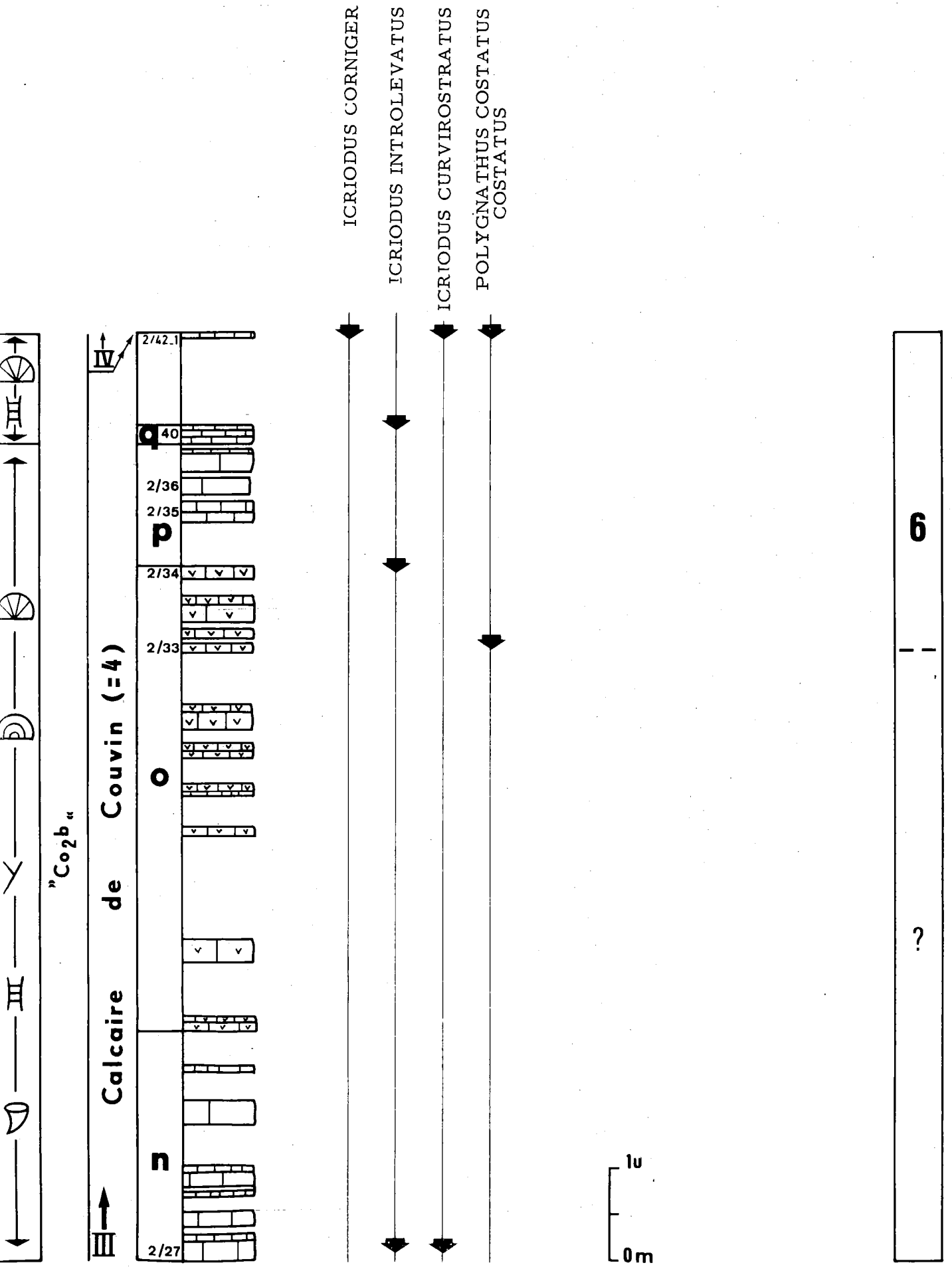
COUVIN EAU NOIRE G①c(M.g.m.4-6)

1960 - M. LECOMPTE, A.S.G.B., 83, p. 34 - 42, fig. 4.
1969 - H.H. TSIEN, Mém. Inst. Géol. Univ. Louvain, p. 13 - 14, pl. 4.
1970 - P. BULTYNCK, Mém. Inst. Géol. Univ. Louvain, p. 30 - 32, pl. 35.



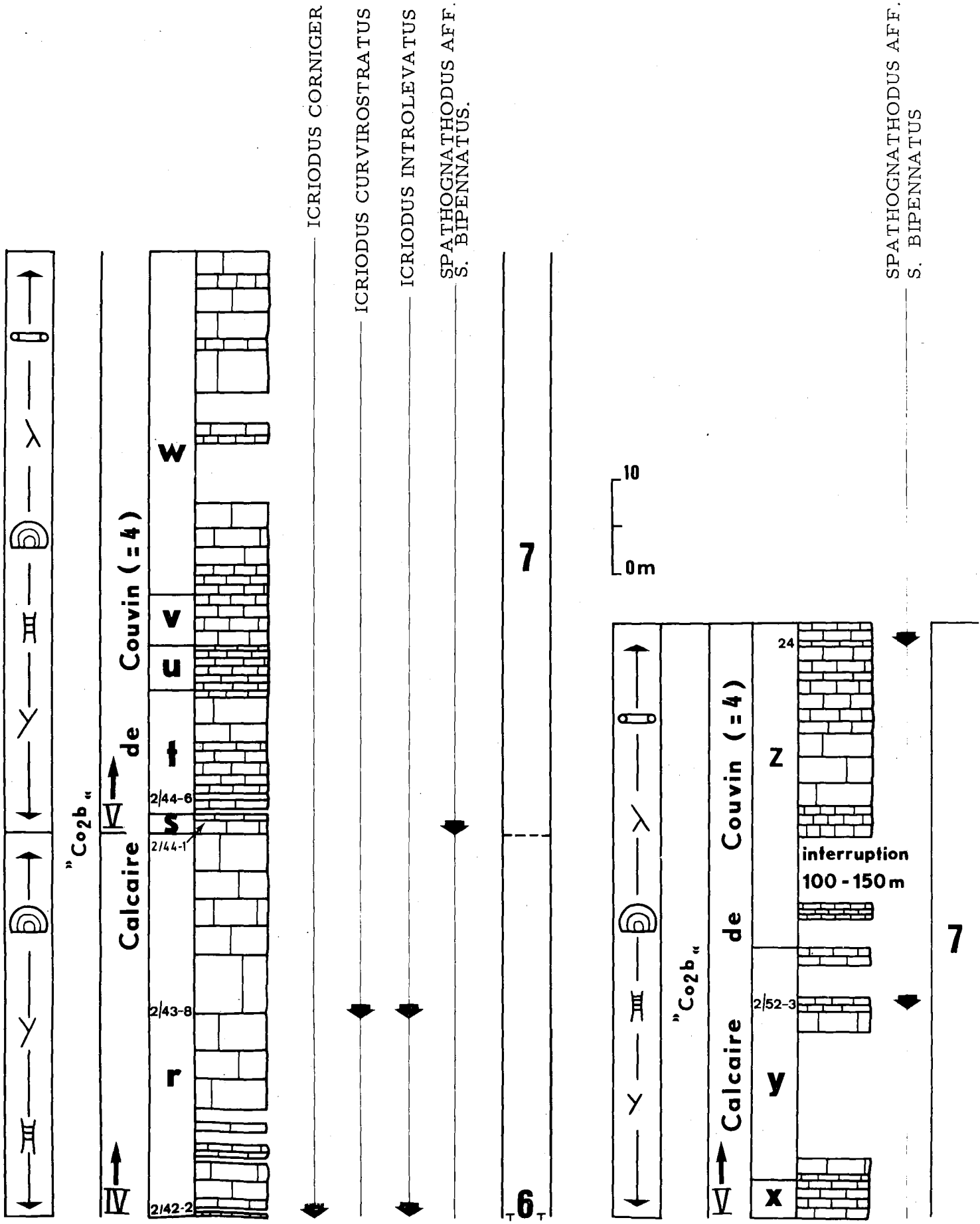
COUVIN EAU NOIRE G①d (M.g.m.6)

1970 - P. BULTYNCK, Mém. Inst. Géol. Univ. Louvain, p. 32 - 33, pl. 35

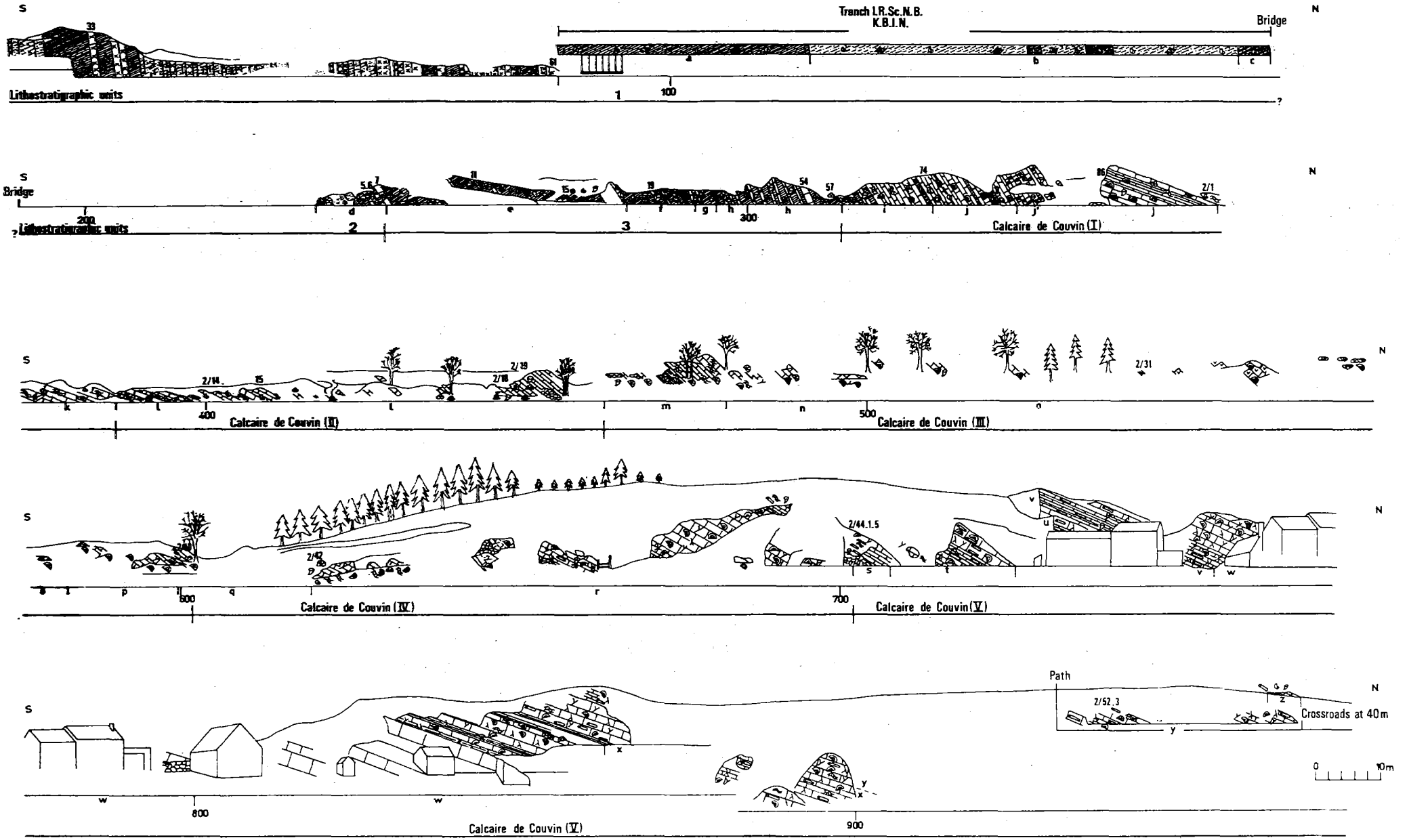


COUVIN EAU NOIRE G①e(M.g.m.7)

1960 - M. LECOMPTE, A. S. G. B., 83, p. 45 - 50, fig. 6.
1969 - H. H. TSIEN, Mém. Inst. Géol. Univ. Louvain, pl. 4
1970 - P. BULTYNCK, Mém. Inst. Géol. Univ. Louvain, p. 33 - 36, pl. 35.



COUVIN EAU NOIRE G①a-e (M.g.m.1-7)



COUVIN - Béguinage G (2)

This outcrop partially completes the gap between formation 1 and 2 in the Eau Noire section; it contains the Emsian - Couvinian boundary ("Assise de Hierges" - "Assise de Bure"). A fact established on one of the biostratigraphic criteria proposed by H. de DORLODOT (1901, pp. 153 - 154 and p. 188), namely the extinction of "Spirifer" arduennensis.

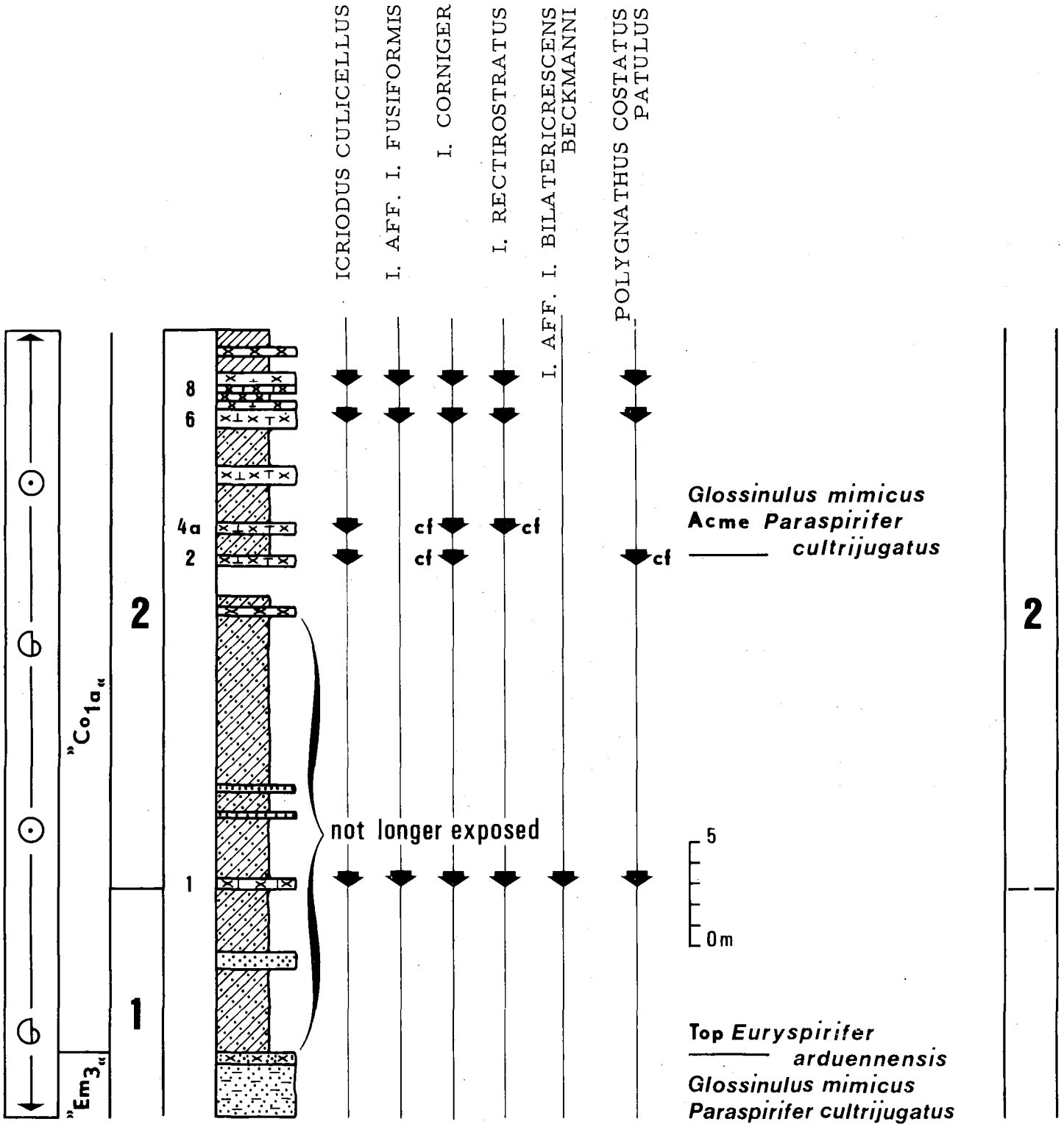
The base of the lithostratigraphic unit 2 is marked by a 50 cm coarse, crinoïdal, shelly limestone. Conodont counts recorded are of the order of 20 to 50 /Kg; they are most abundant in bed 6. The fauna is again largely dominated by Icriodus. It is to be noted that the first occurence of Polygnathus costatus patulus is in bed 1.

The top of the section correlates (± 2 m below) with the base of the exposure on the left hand side of the Eau Noire (sheet G(1)b).

Four kilometers E of COUVIN (NISMES, see locality in P. BULTYNCK 1970, p. 28) it is proposed that the K.Belg. Inst. Nat. Wet. - Inst. r. Sci. Nat. Belg. will excavate a cut of about 300 m and expose permanently the boundary layers between the Emsian and Couvinian.

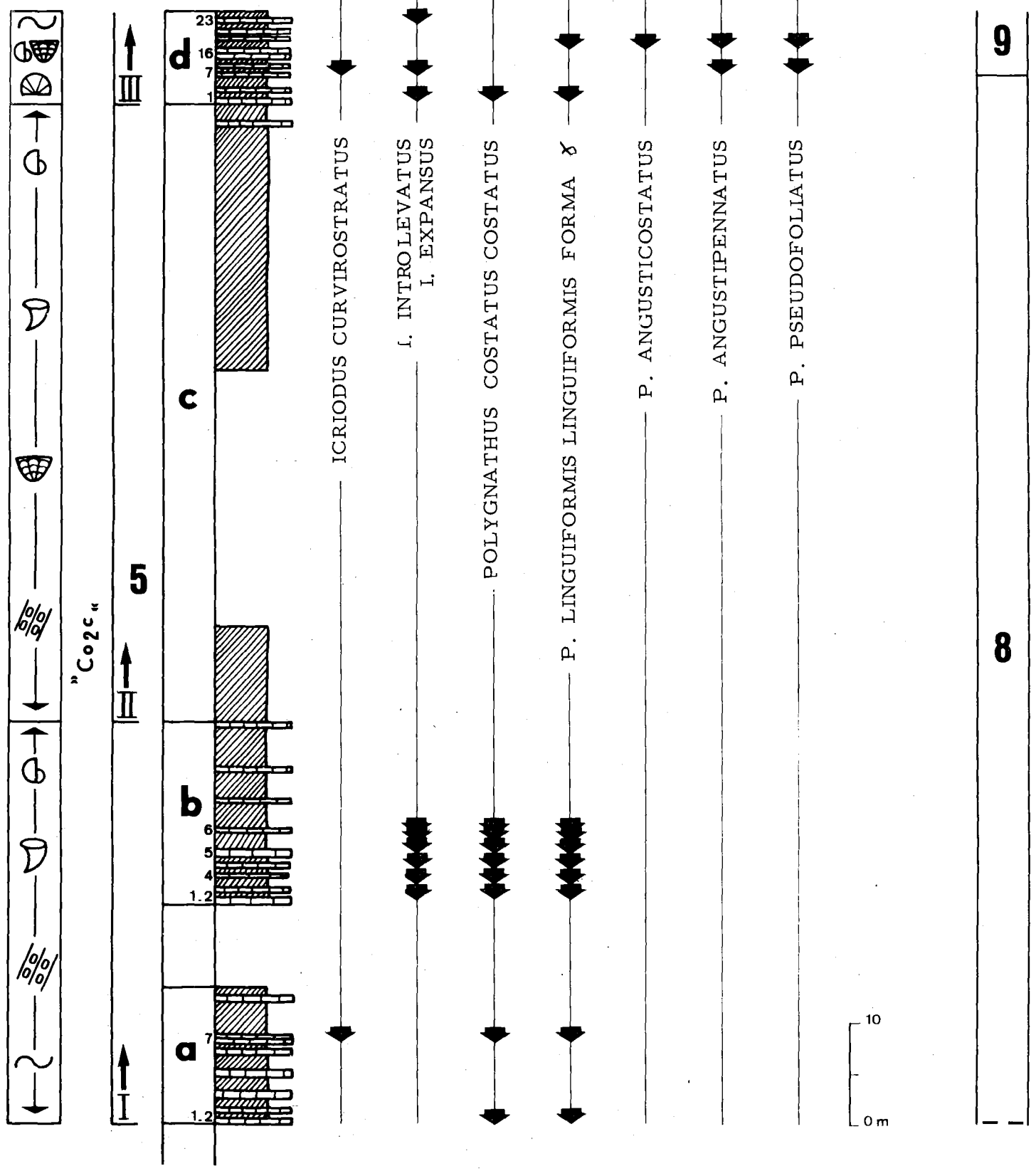
COUVIN BEGUINAGE G② (M.g.m.2)

1970 - P. BULTYNCK, Mém. Inst. Géol. Univ. Louvain, p. 21 , 27 - 28, pl. 35.



COUVIN WEST G③(M.g.m.8-9)

1970 - P. BULTYNCK, Mém. Inst. Géol. Univ. Louvain, p. 36 - 41, pl. 35



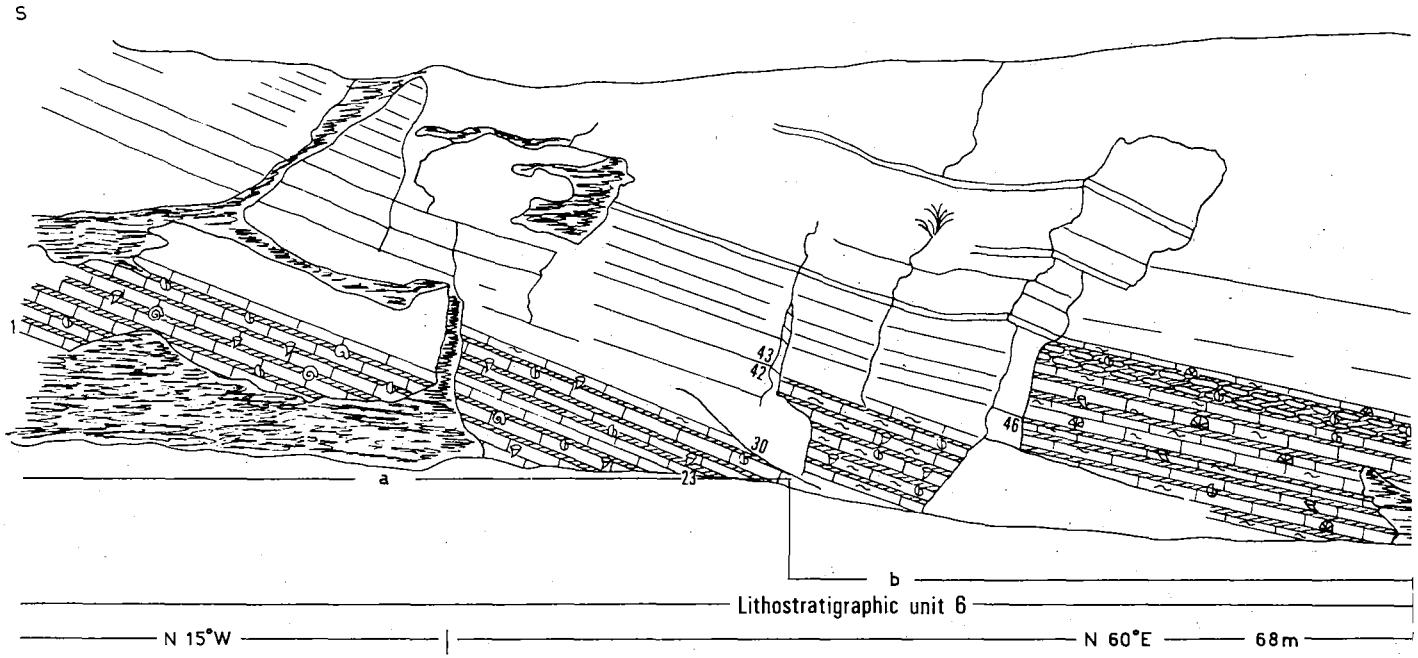
COUVIN - Haine Quarry G (4)

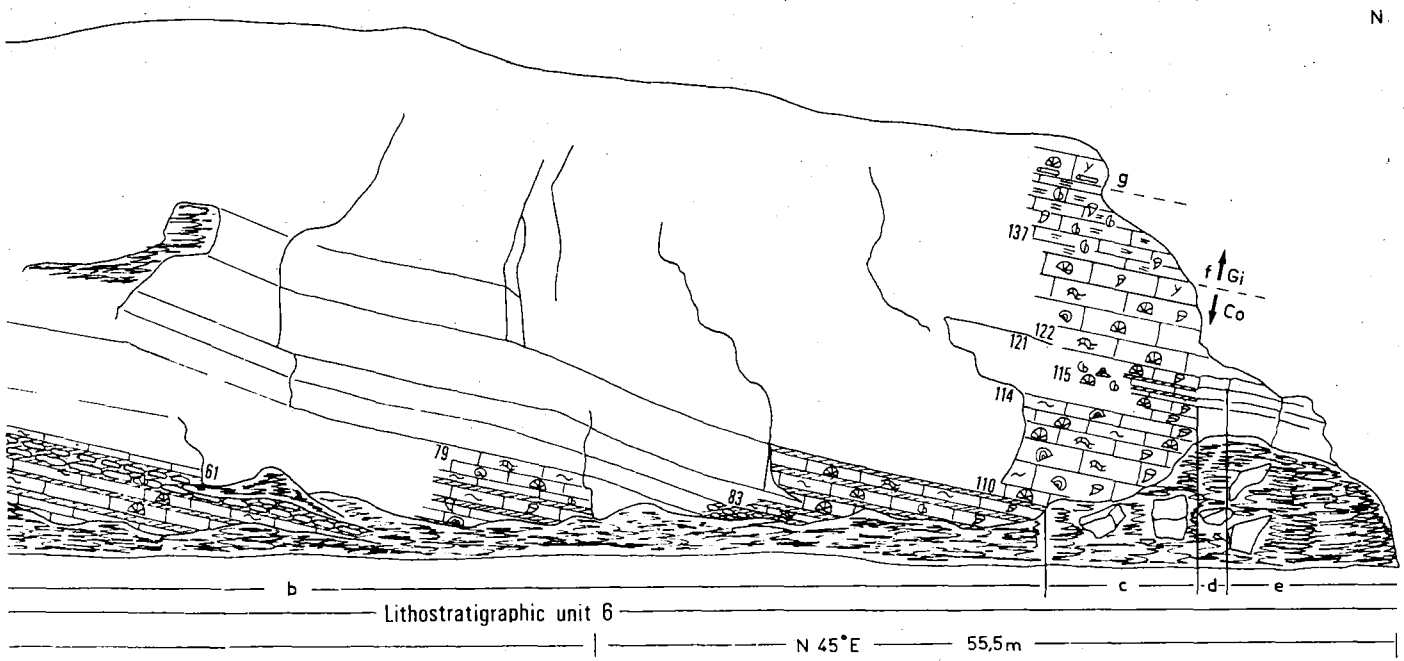
The Haine Quarry is situated 1 Km NNW of the town, 200 m W from the road COUVIN - PHILIPPEVILLE, on Km 33,650.

The base of formation 6 marked by dark, argillaceous limestones alternating with dark, calcareous shales and lying on the calcareous, micaceous siltstones and shales forming the top of formation 5, is not exposed in the quarry; this contact is ± 20 m below. Part g, and probably part f, of Formation 7 correlates with the "Calcaire de Givet" according to the description by M. ERRERA, B. MAMET and P. SARTENAER (1972).

Every limestone sample contains a few conodonts (1 - 5 /Kg). Significant is the first occurence of representatives of the Polygnathus varcus group according to the definition of this group by G. KLAPPER, G.M. PHILIP and J.H. JACKSON (1970, p. 651); also important is the restricted record of Spathognathodus bidentatus and the appearance of Spathognathodus bipennatus.

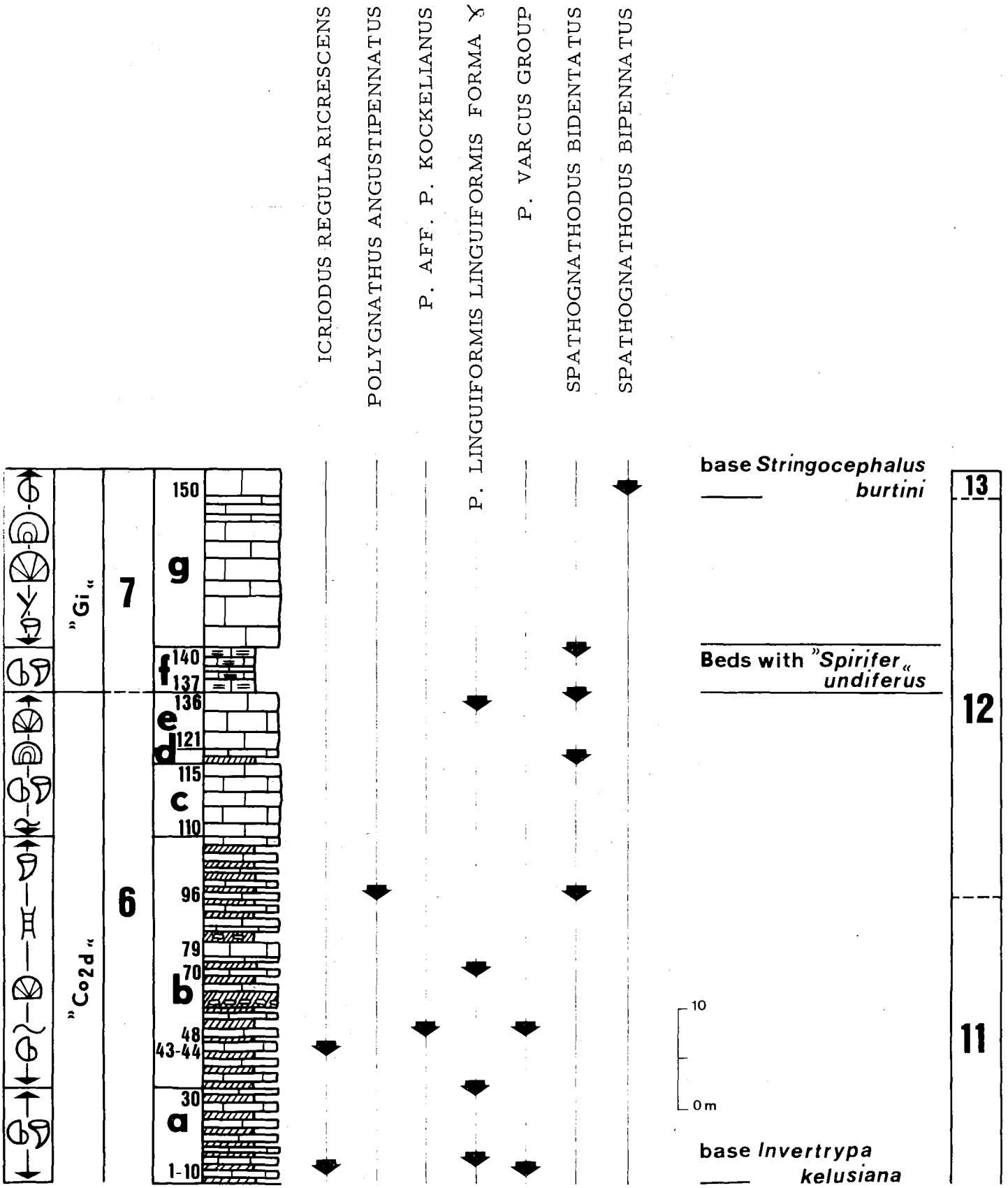
COUVIN HAINE QUARRY G④ (M.g.m.11-13)





COUVIN HAINE QUARRY G④(M.g.m.11-13)

1960 - M. LECOMPTE, A.S.G.B., 83, p. 51 - 55, fig. 7.
1969 - H.H. TSIEN, Mém. Inst. Géol. Univ. Louvain, 25, p. 14 - 15, pl. 4.
1970 - P. BULTYNCK, Mém. Inst. Géol. Univ. Louvain, 26, p. 50 - 51, pl. 35.



NISMES - 212 G(5)

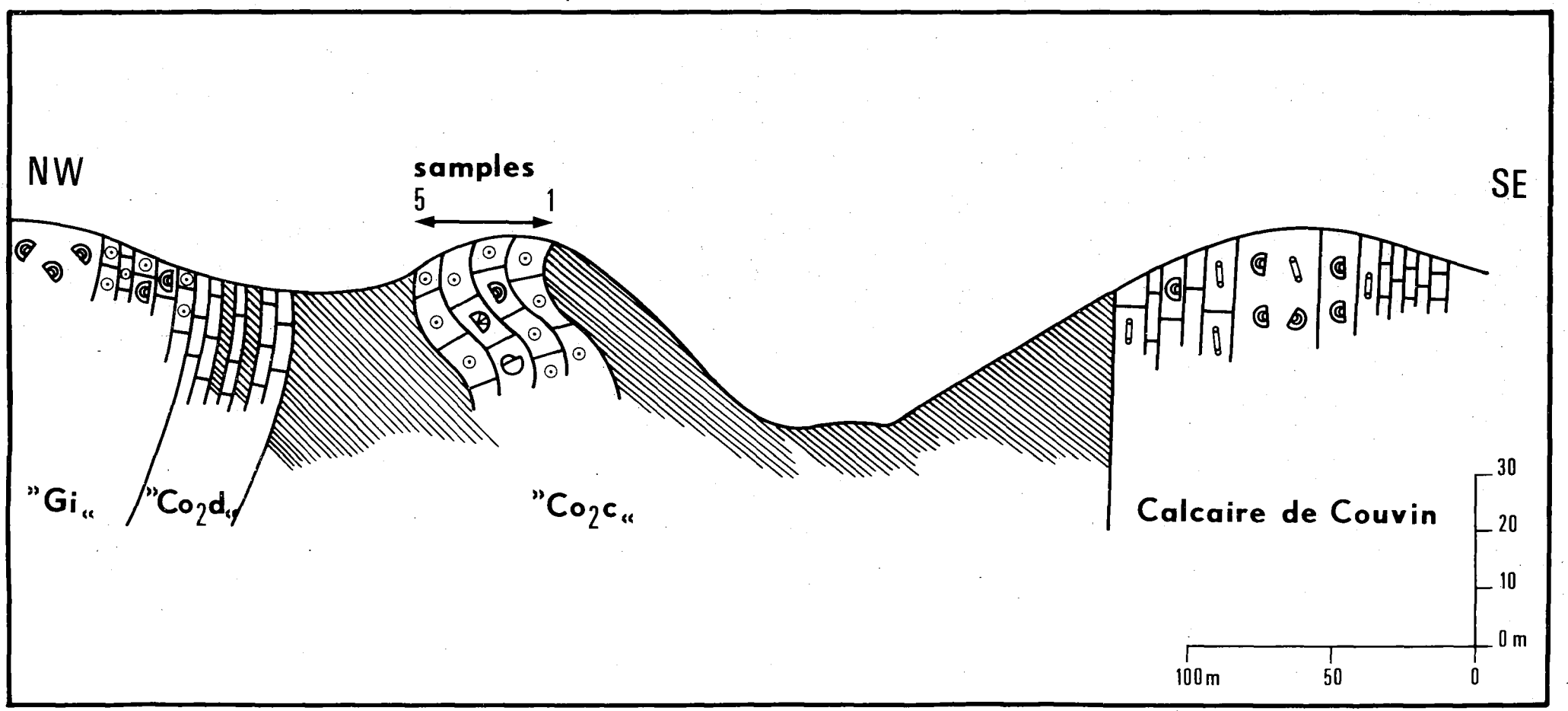
On a hill-side, 1 Km SE of NISMES and 200 m SW of the "Fondri des Chiens", a limestone body of the bioherm type, built up by coarse crinoïdal limestone and Stromatoporoïds and Tabulate corals and isolated in shales of the upper part of Formation 5, is exposed.

These limestone lenses produce the most abundant and diversified Couvinian conodont faunas (more than 100 /Kg).

Conodonts were most abundant in samples 2, 3 and 5. Important elements of the fauna are Icriodus regularicrescens BULTYNCK P. 1970 (the holotype originates from sample 2), Polygnathus angusticostatus, P. angustipennatus, P. eiflius, P. intermedius.

Nismes-212

G⑤(M.g.m.10)



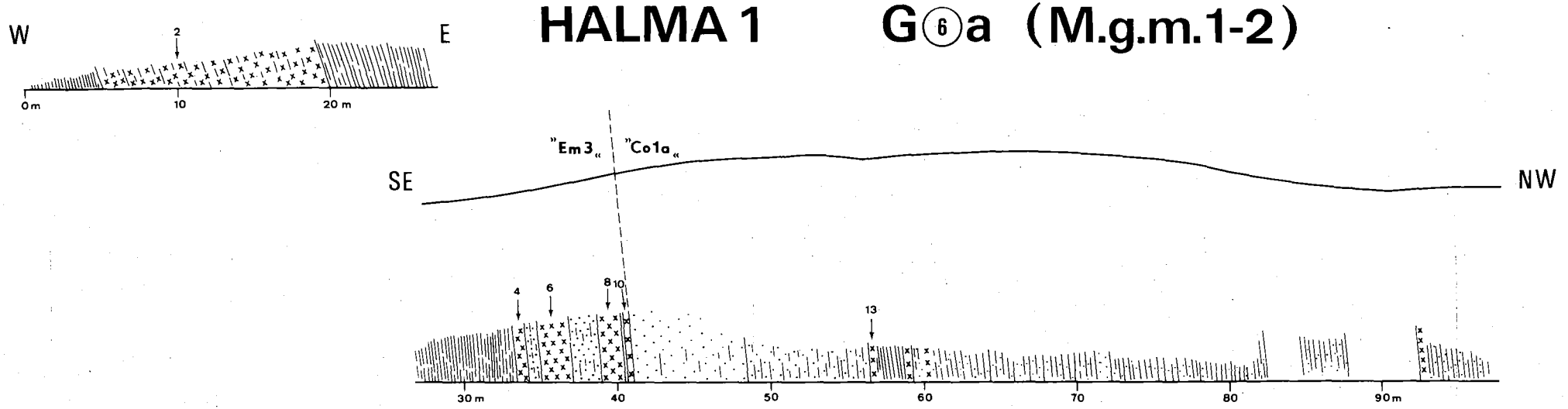
HALMA 1 + Père Finet and HALMA 2 G(6) a - b

The outcrop "Père Finet" is in a road-cut at the intersection of the roads CHANLY - NEUPONT and HALMA - NEUPONT in front of the "Père Finet" inn. HALMA 1 is exposed along the W road-cut of the road NEUPONT - HALMA, 280 m NE of the preceding outcrop. HALMA 2 is in front of HALMA 1, along the HALMA creek.

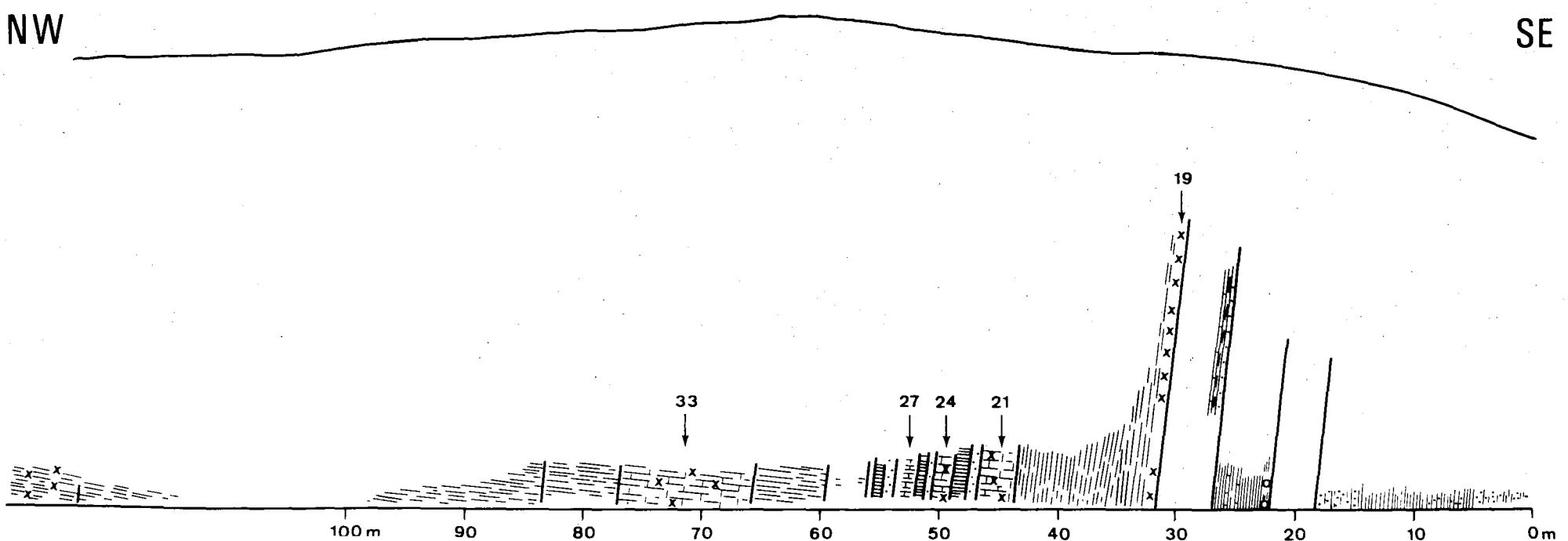
As is the case in the COUVIN area, the base of Formation 2 is characterized by the appaearance of crinoïdal, shelly limestone beds, the shelly beds of Formation 1 being more argillaceous or sandy. Bed 19 (HALMA 1) correlates with bed 19 (HALMA 2).

The Emsian - Couvinian boundary is traced by the extinction of Euryspirifer arduennensis.

Conodont faunas occur in most of the shelly limestone beds (10/Kg), they are most abundant in beds 8 and 33.



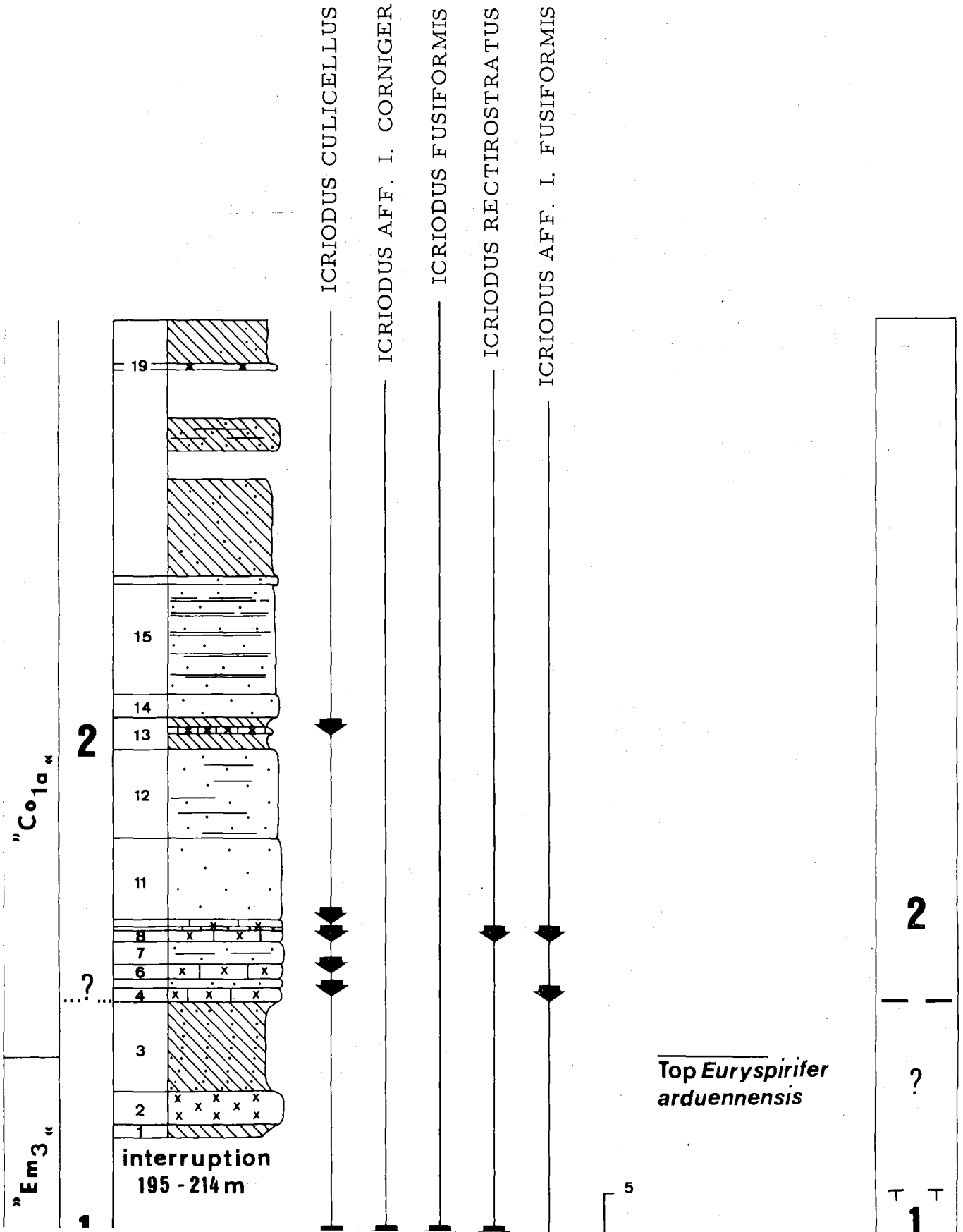
HALMA 2 G⑥b (M.g.m.2)



HALMA 1 · PÈRE FINET — G⑥a (M.g.m.1-2)

1965 - J. GODEFROID, Ann. Soc. Geol. Belgique, t. 88, Bull. 1 - 4, pp. B 77 - B 79, fig. 3 dans le texte.

1968 - J. GODEFROID, Ac. Roy. Belgique, Cl. des Sciences, Mém., Coll. in - 4°, 2e ser., T. XVII, fasc. 3, pp. 10, pl. 2, fig. 2 dans le texte.

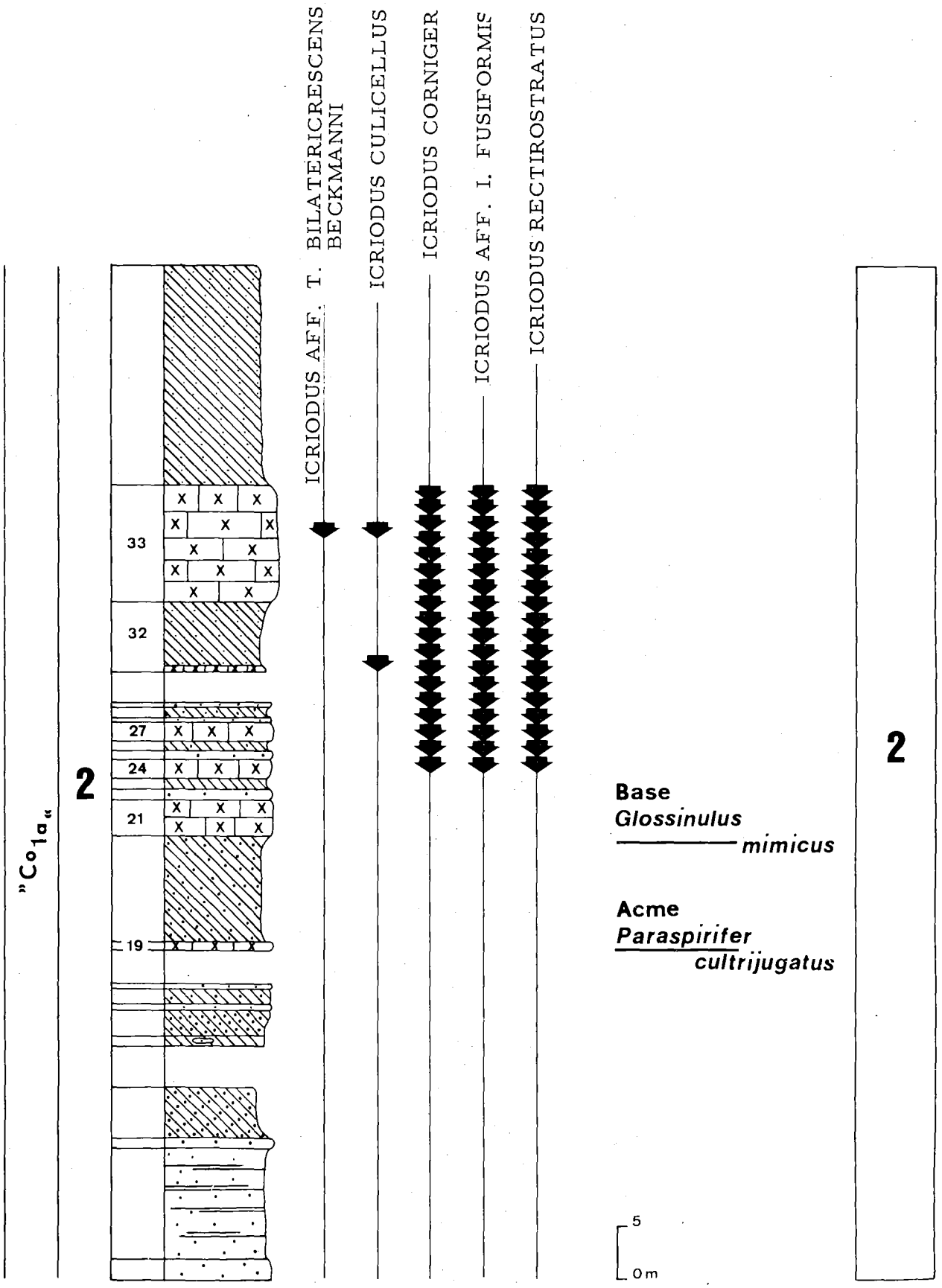


HALMA 2

G⑥b (M.g.m.2)

1965 - J. GODEFROID, Ann. Soc. Géol. Belgique, t. 88, Bull. 1 - 4, pp. B 77 - B 79, fig. 3 dans le texte.

1968 - J. GODEFROID, Acad. Roy. Belgique, Cl. des Sciences, Mém., Coll. in - 4°, 2e ser., T. XVII, fasc. 3, pp. 10 - 12, pl. 2, fig. 3 dans le texte.



HALMA 7 G(7) a-b

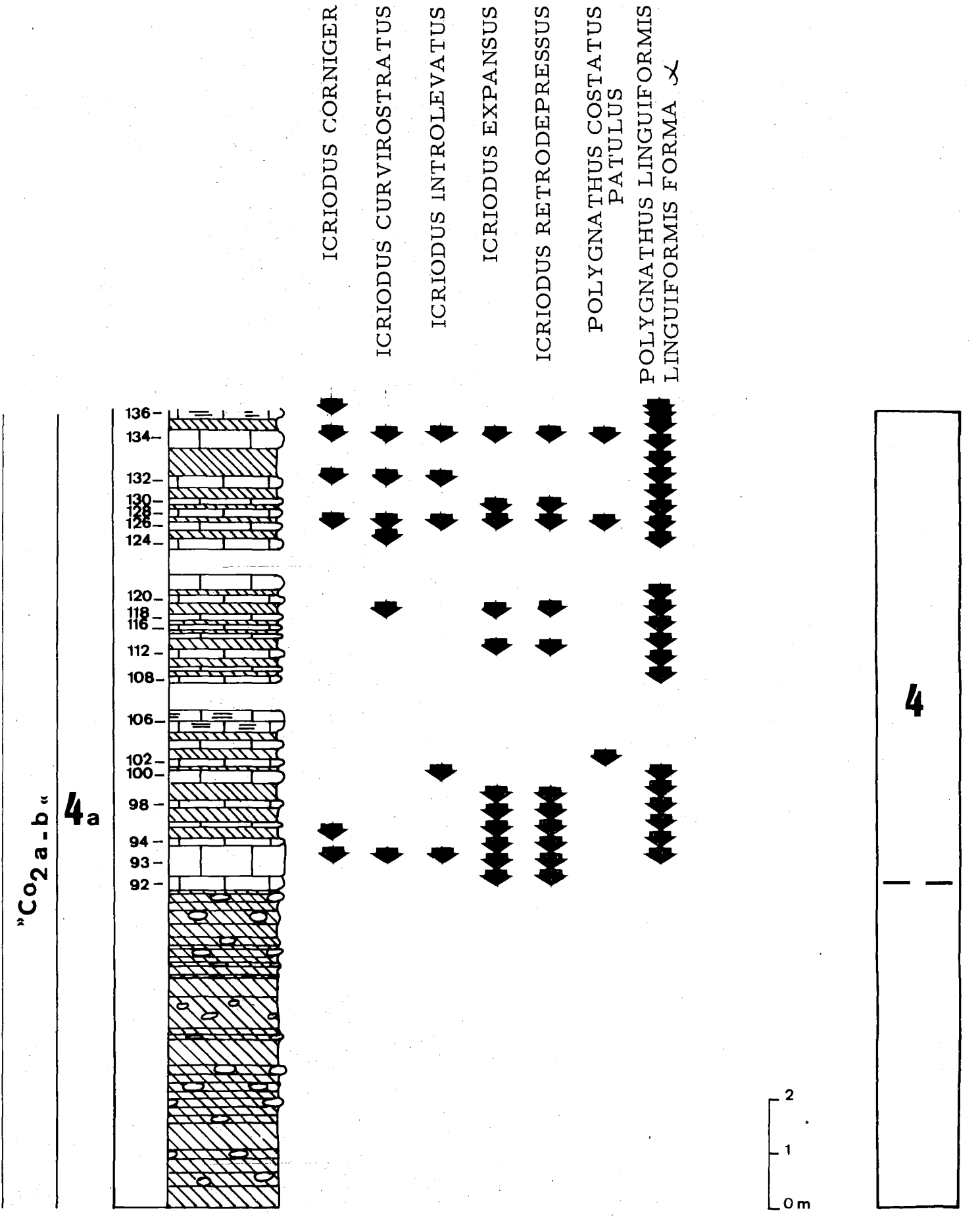
The section is along the road HALMA - WELLIN, 400 m E of the cross-road to WELLIN. Formation 4a forms part of the JEMELLE Formation and can be correlated biostratigraphically with the lower part of the "Calcaire de COUVIN".

Conodonts occur abundantly in bed 93 and frequently in beds 92, 126, 134, 137, 148, 156, 160, 174, 183.

Important is the occurence of Polygnathus linguiformis cooperi.

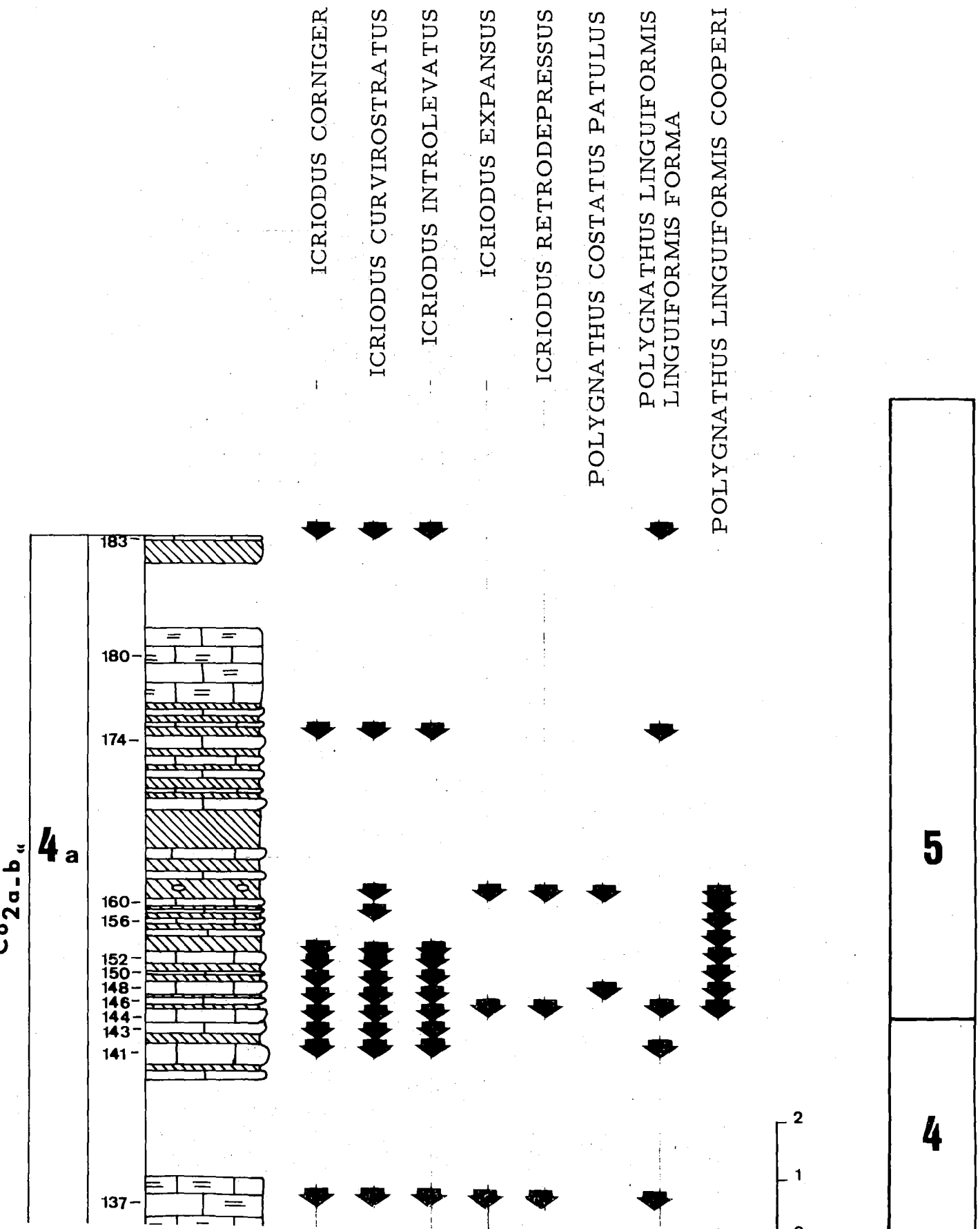
HALMA 7 G①a (M.g.m.4)

1968 - J. GODEFROID , Acad. Roy. Belgique, Cl. des Sciences, Mém., Coll. in - 4° , 2e ser. , T. XVII, fasc. 3, pp. 13 - 15, pl. 2 fig. 4 dans le texte.

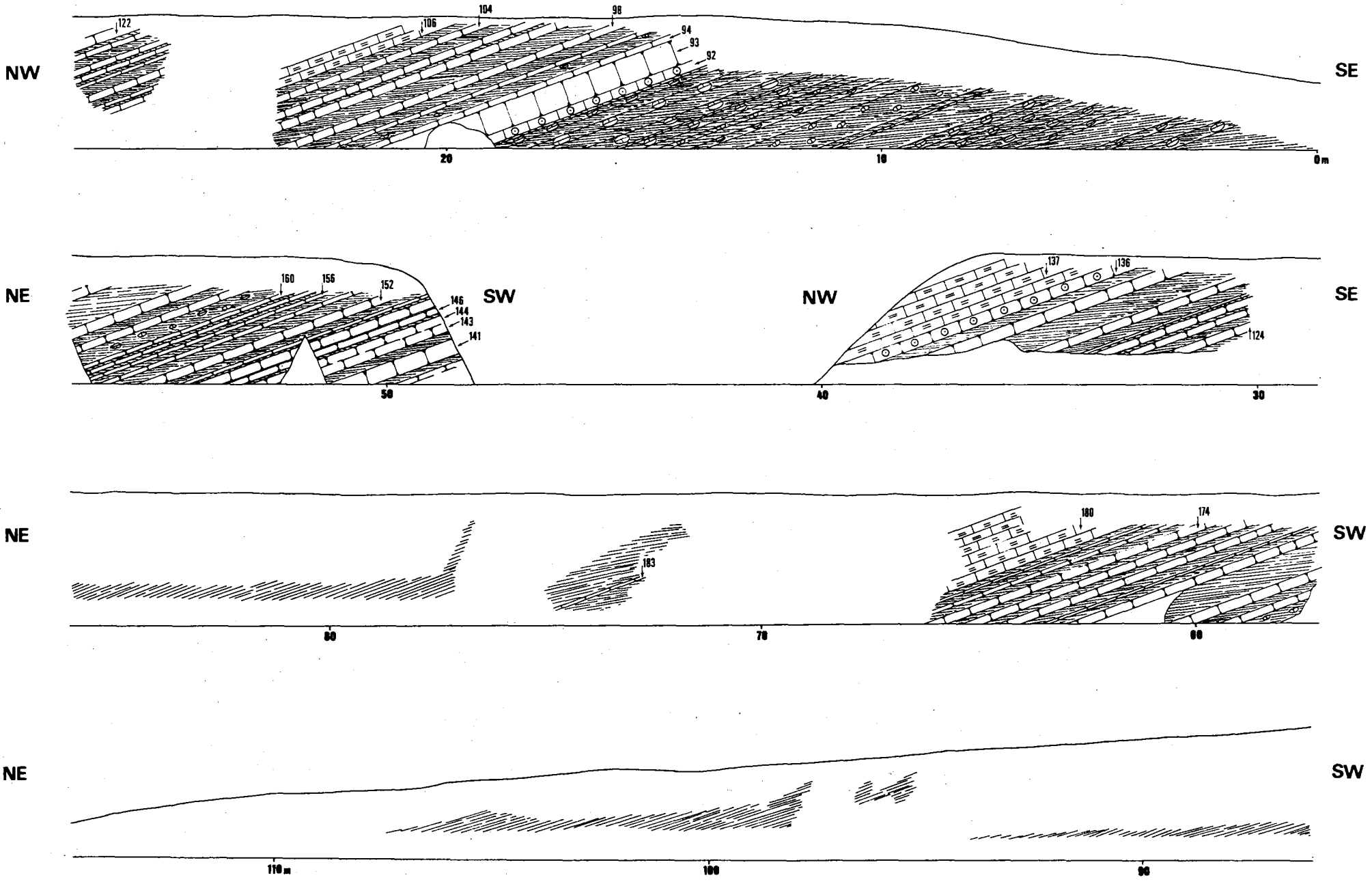


HALMA 7 G⑦b (M.g.m.4-5)

1968 - J. GODEFROID, Acad. Roy. Belgique, Cl. des Sciences, Mém., Coll. in - 4°, 2e ser., T. XVII, fasc. 3, pp. 13 - 15, pl. 2, fig. 4 dans le texte.



HALMA 7 G⑦a-b (M.g.m.4-5)



WELLIN - FOND DES VAUX 1, 2 et 5 G (8) a - e

These sections are exposed along the road WELLIN - SOURD D'AVE :
Fond des Vaux 1 : outcrop on the hill side E of the road.
Fond des Vaux 2 : E road-cut, 90 m N of the end of the preceding outcrop.
Fond des Vaux 3 : abandoned quarry E of the "Ry d'Ave".

Formation 5 is part of the JEMELLE Formation. The lower part of the section (2 to 72) can be correlated biostratigraphically with the members I to III of the Formation 5 in the COUVIN area and the upper part (113 - 148) with the biohermal limestone bodies within the upper part of the same formation (see also NISMES - 212, G (5)).

Beds 72, 113, 140, 142, 148, 160 and 172 yield very good Conodont faunas (more than 100 /Kg). Important are the first occurences of Icriodus regularicrescens, Polygnathus angustipennatus, P.pseudofoliatus, P. eiflius, P. intermedius, P. trigonicus, etc...
The holotype of Polygnathus intermedius originates from a small outcrop on the opposite hill-side which correlates with samples 113 to 156.

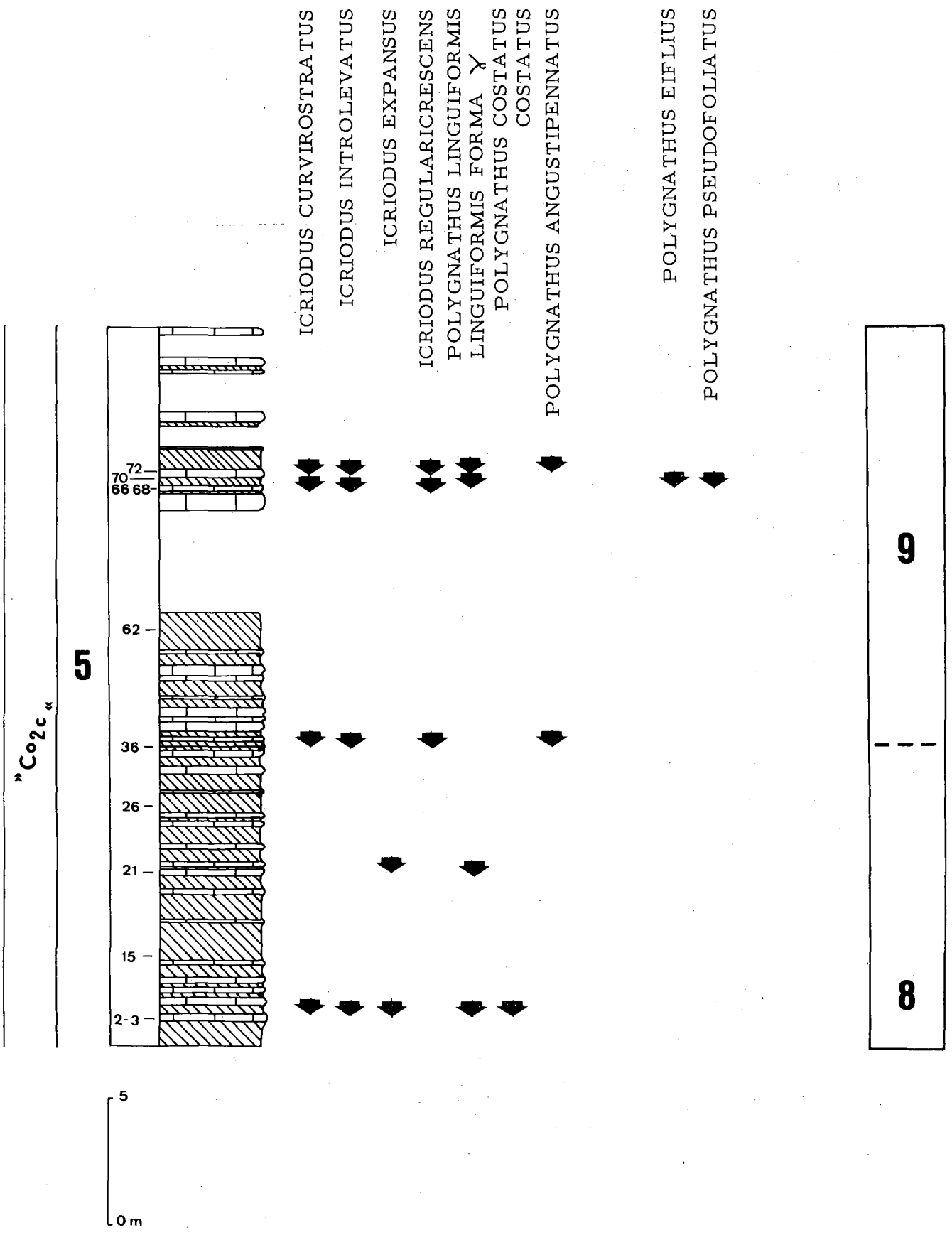
Formation 6 is characterized by an alternation of argillaceous limestones and calcareous shales. The top of the formation is marked by the first massive limestone bed. From this bed on the sequence may belong to the "Calcaire de GIVET". The "Co2d" - "Gi" boundary is based on the first occurence of Undispirifer undiferus.

To obtain good Conodont faunas 3 - 4 kg samples are needed. Spathognathodus bidentatus appears in bed 3, Spathognathodus bipennatus in bed 40 and Icriodus obliquimarginatus in bed 32.

WELLIN-FOND DES VAUX 1 G⑧a (M.g.m.8-9)

1937 - P. DUMON et E. MAILLIEUX, Bull. Mus. Roy. Hist. Nat. Belgique, T. XIII, n° 37, p. 2, p. 3, p. 4

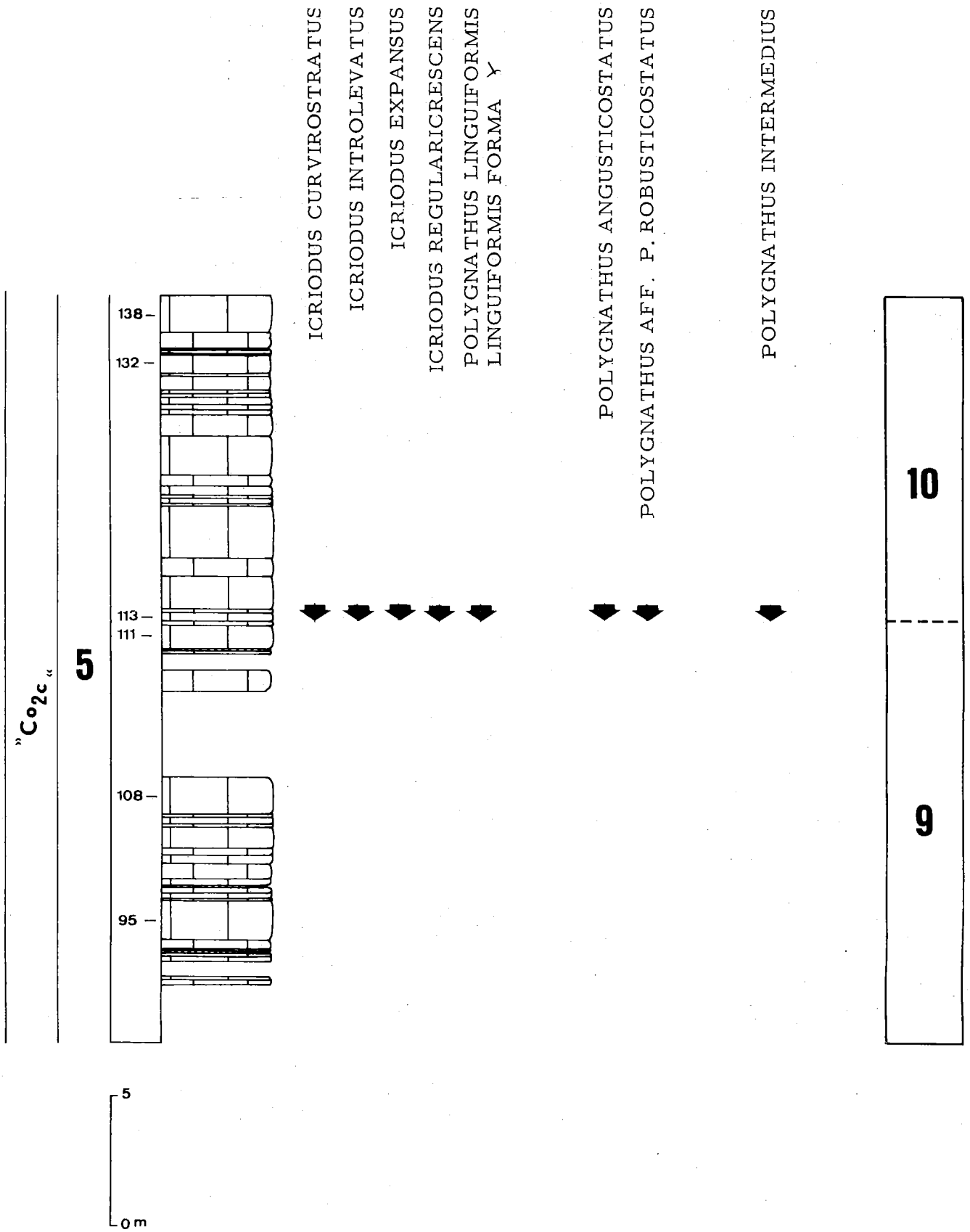
1968 - J. GODEFROID, Acad. Roy. Belgique, Cl. des Sciences, Mém., Coll. in-4°, 2e ser., T. XVII - fasc. 3, pp. 16 - 21, pl. 3, fig. 6 dans le texte.



WELLIN-FOND DES VAUX 1 G⑧b (M.g.m.9-10)

1937 - P. DUMON et E. MAILLIEUX, Bull. Mus. Roy. Hist. Nat. Belgique, T. XIII, n° 37, p. 2, p. 3, p. 4

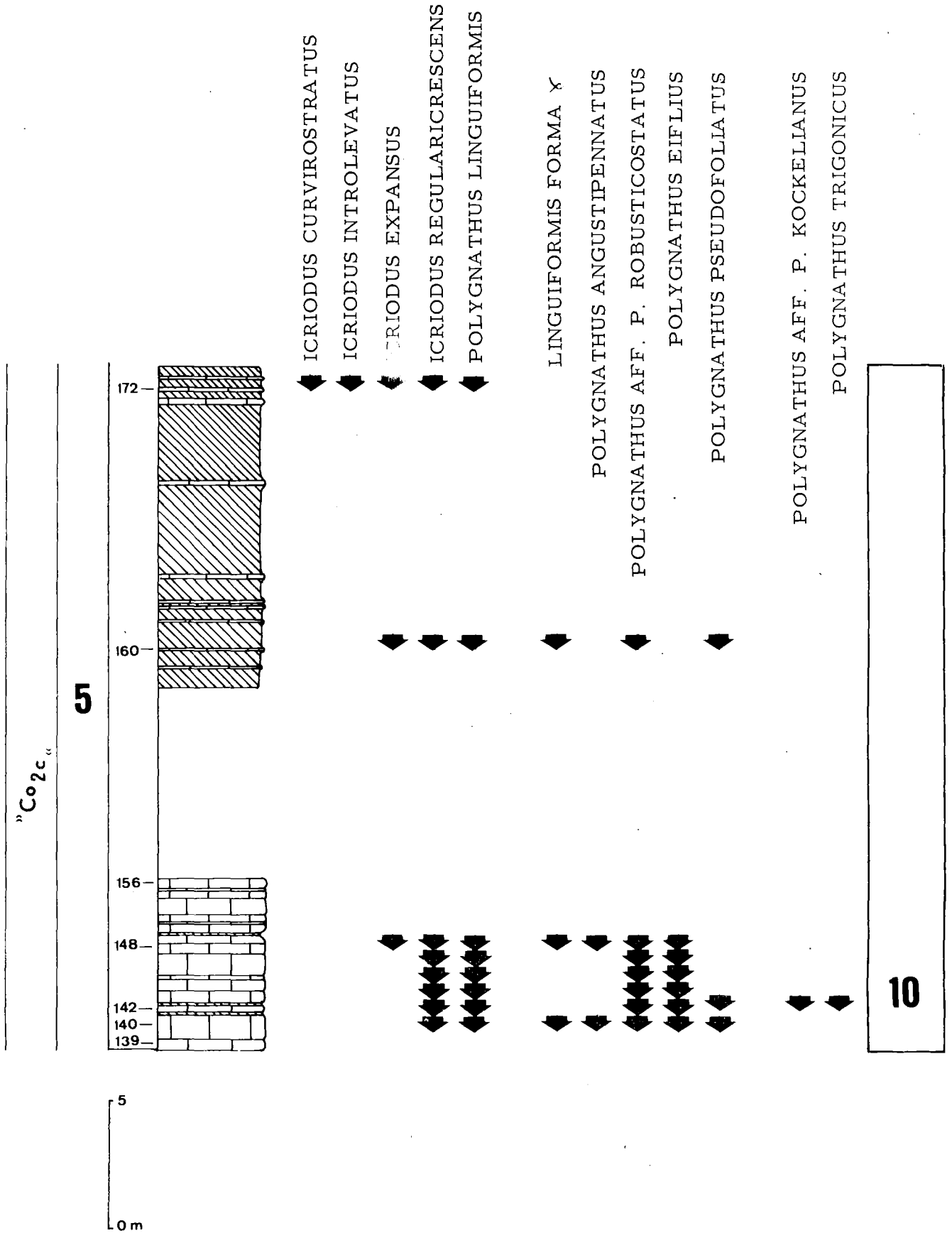
1968 - J. GODEFROID, Acad. Roy. Belgique, Cl. des Sciences, Mém. , Coll. in-4°, 2e ser., T. XVII - fasc. 3, pp. 16 - 21, pl. 3, fig. 6 dans le texte.



WELLIN-FOND DES VAUX 1 G⑧c (M.g.m.10)

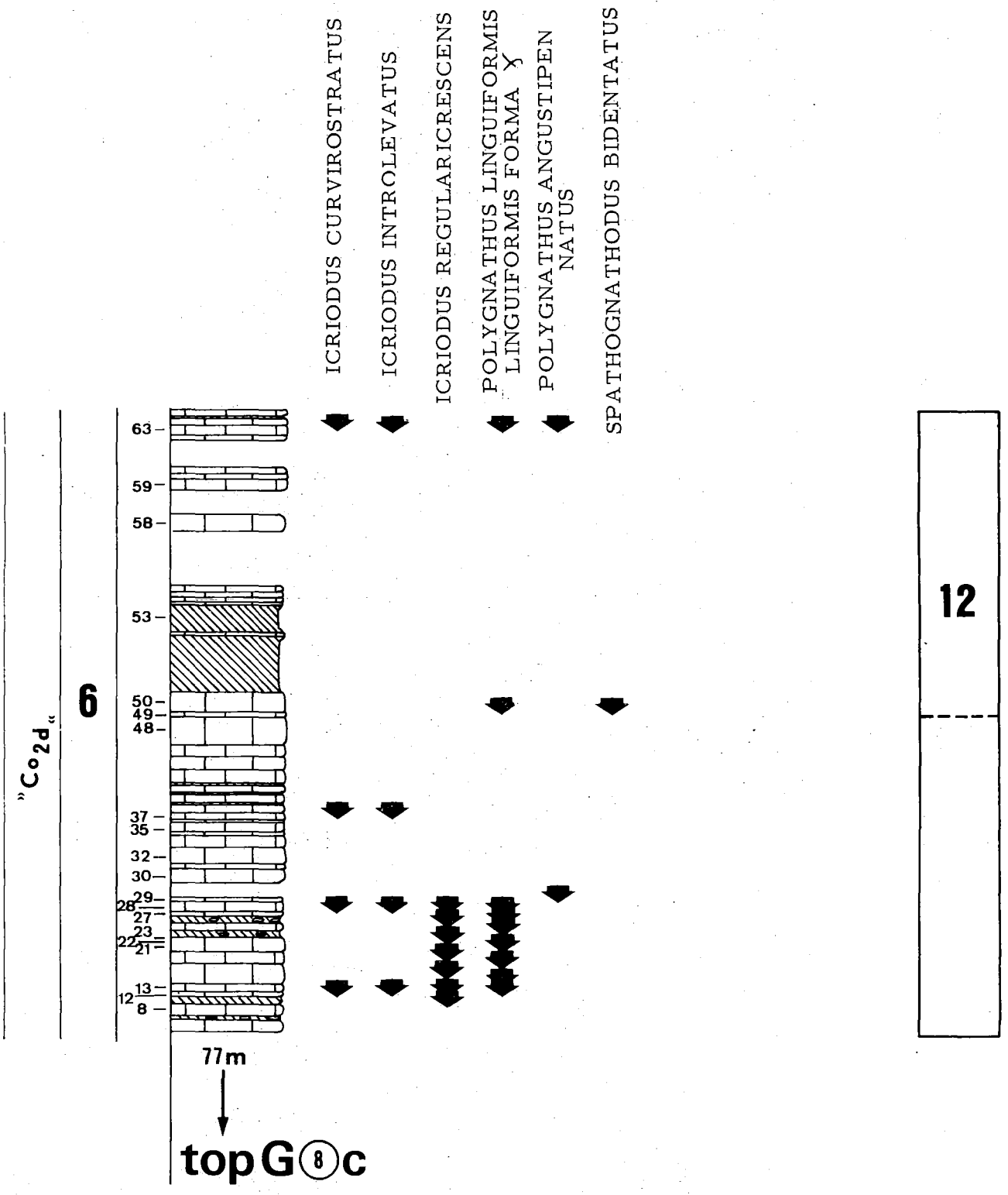
1937 - P. DUMON et E. MAILLIEUX, Bull. Mus. Roy. Hist. Nat. Belgique, T. XIII, n° 37, p. 2, p. 3, p. 4

1968 - J. GODEFROID, Acad. Roy. Belgique, Cl. des Sciences, Mém., Coll. in - 4°, 2e ser., T. XVII - fasc. 3, pp. 16 - 21, pl. 3 fig. 6 dans le texte.

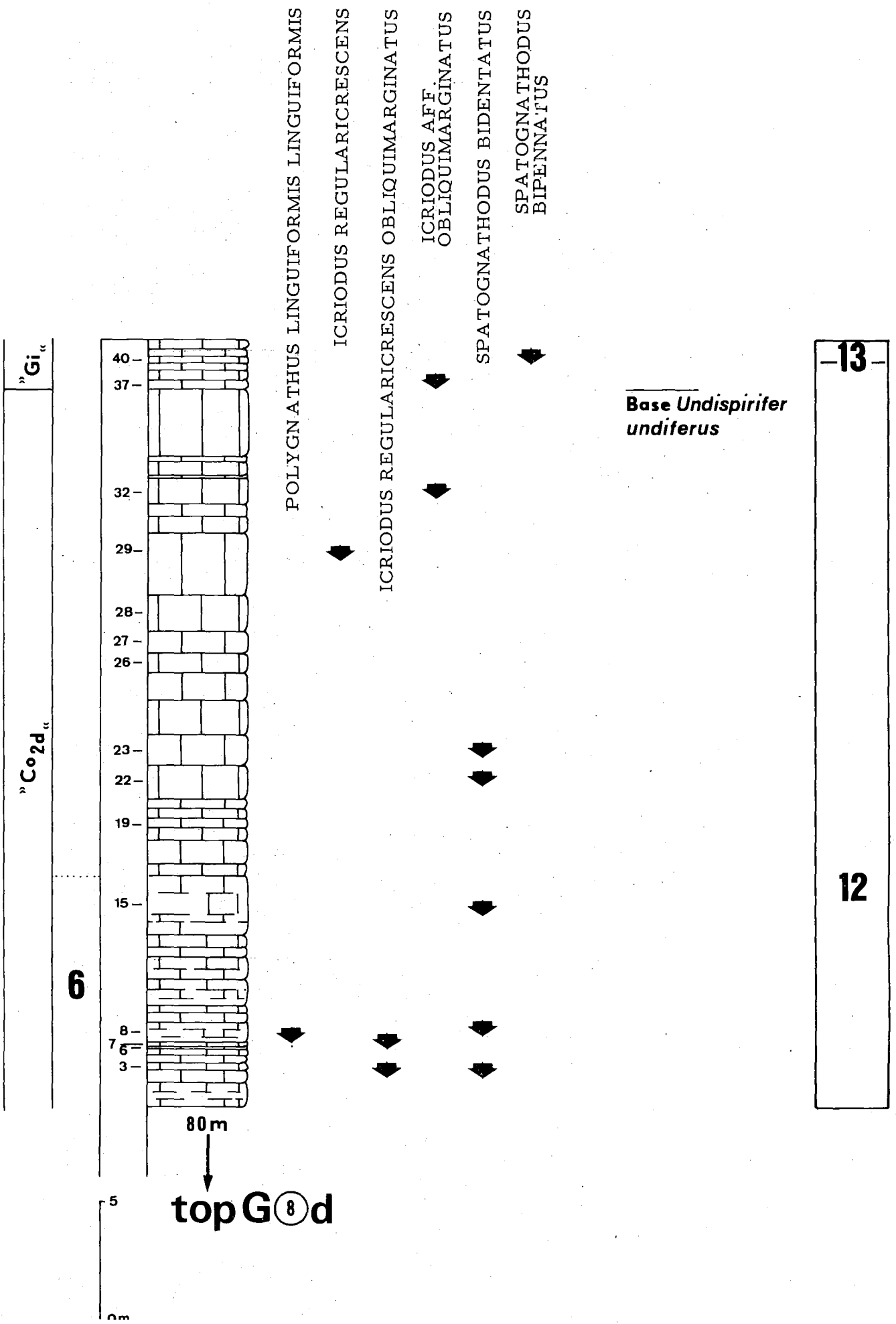


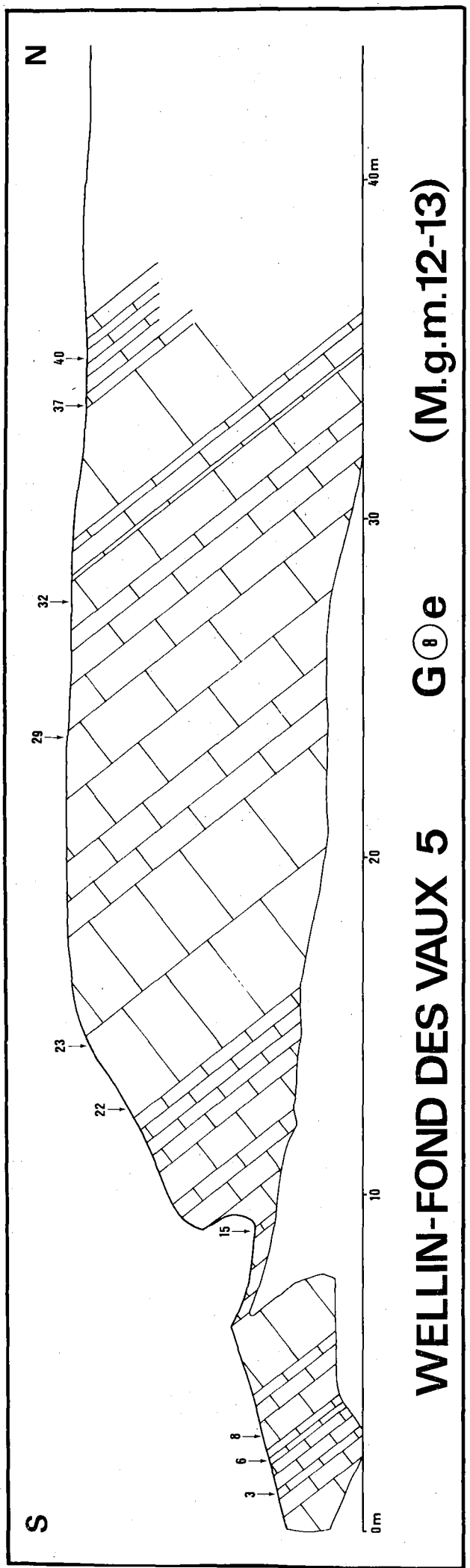
WELLIN-FOND DES VAUX 2 G⑧d (M.g.m.12)

1968 - J. GODEFROID, Acad. Roy. Belgique, Cl. des Sciences, Mém. , Coll. in - 4°, 2e ser., T. XVII, fasc. 3, pp. 19 - 20, pl. 3.

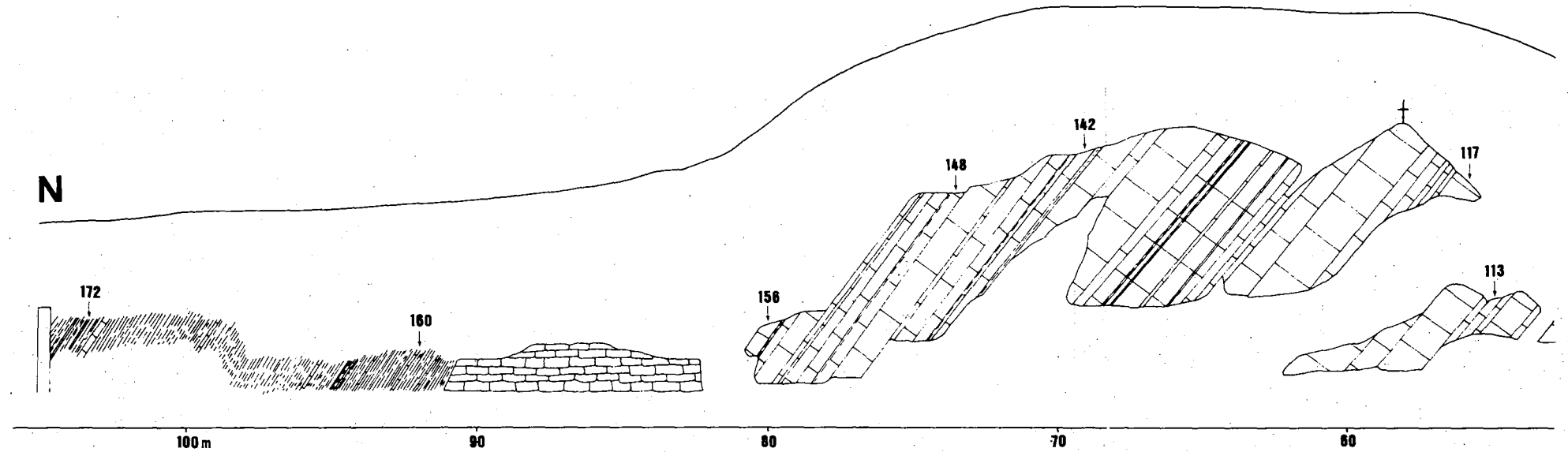


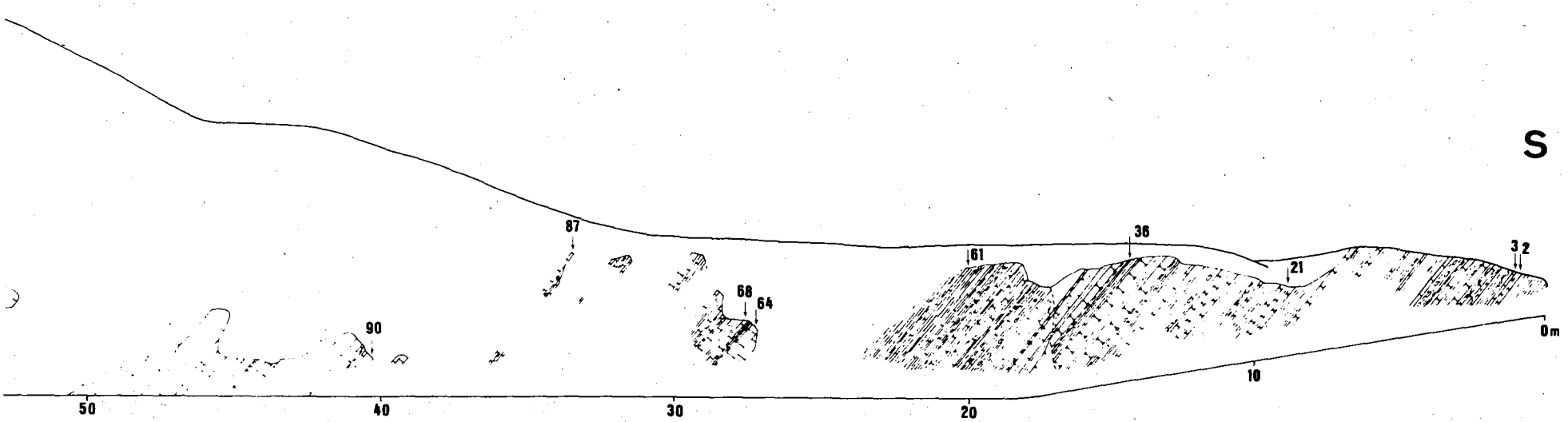
WELLIN-FOND DES VAUX 5 G⑧e (M.g.m.12-13)




N
S
WELLIN-FOND DES VAUX 5
G⑧e
(M.g.m.12-13)
40
37
32
29
23
22
15
8
6
3
0m
10
20
30
40m

WELLIN-FOND DES VAUX 1 G⑧a_c (M.g.m.8-10)





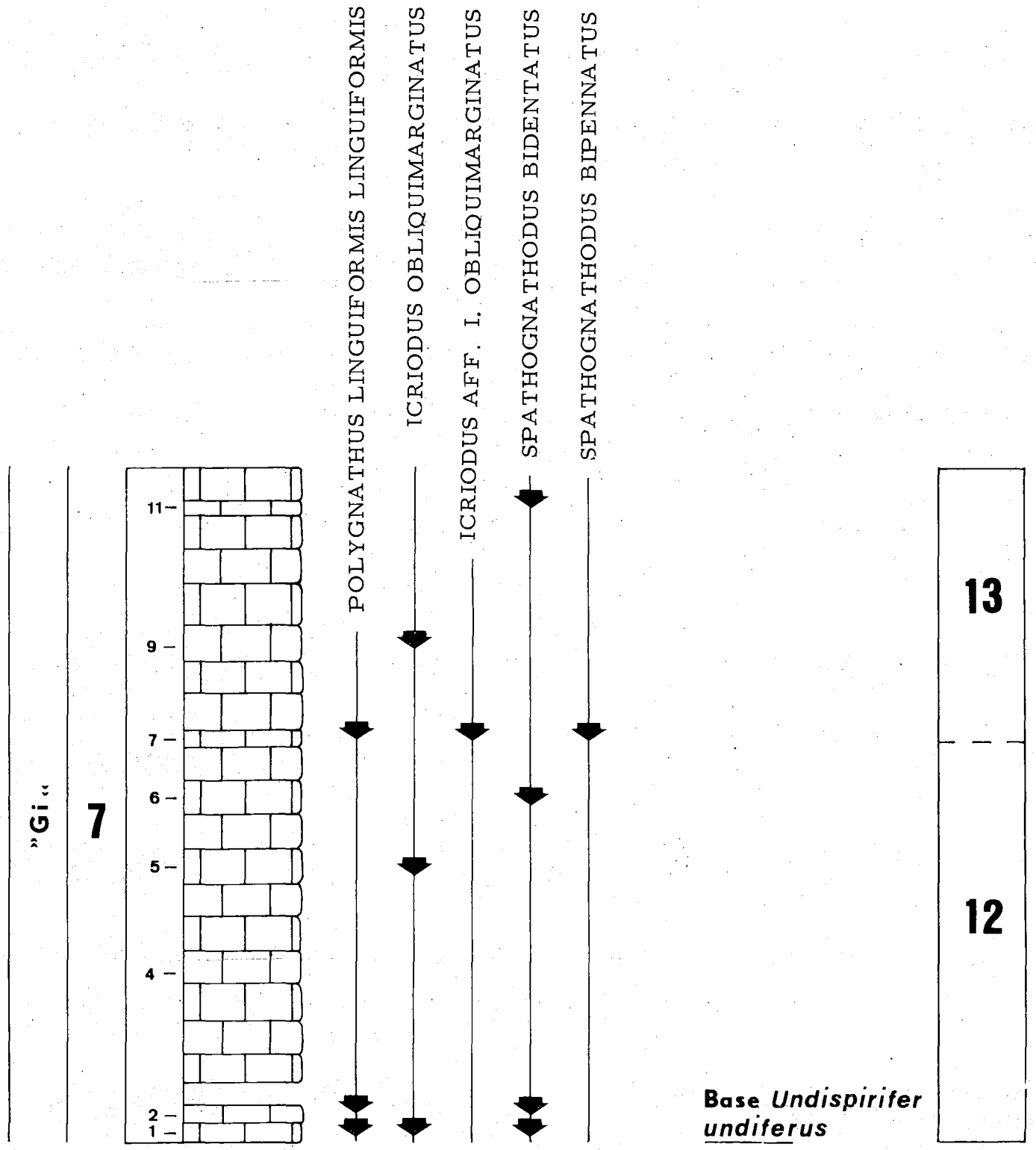
HALMA 10 G (9)

The section outcrops in a road-cut of the road SOURD D'AVE - HALMA, 780 m. S of SOURD D'AVE. The base corresponds very well to the base of the "Calcaire de GIVET" at GIVET.

Conodonts are scarce; at least 4 kg samples are needed to obtain a small fauna. Important is the occurence of Spathognathodus bidentatus, S. bipennatus and Icriodus obliquimarginatus.

HALMA 10 G⑨ (M.g.m.12-13)

1968 - J. GODEFROID, Acad. Roy. Belgique, Cl. des Sciences, Mém., Coll. in - 4°, 2e ser., T. XVII, fasc. 3, p. 16, pl. 3.



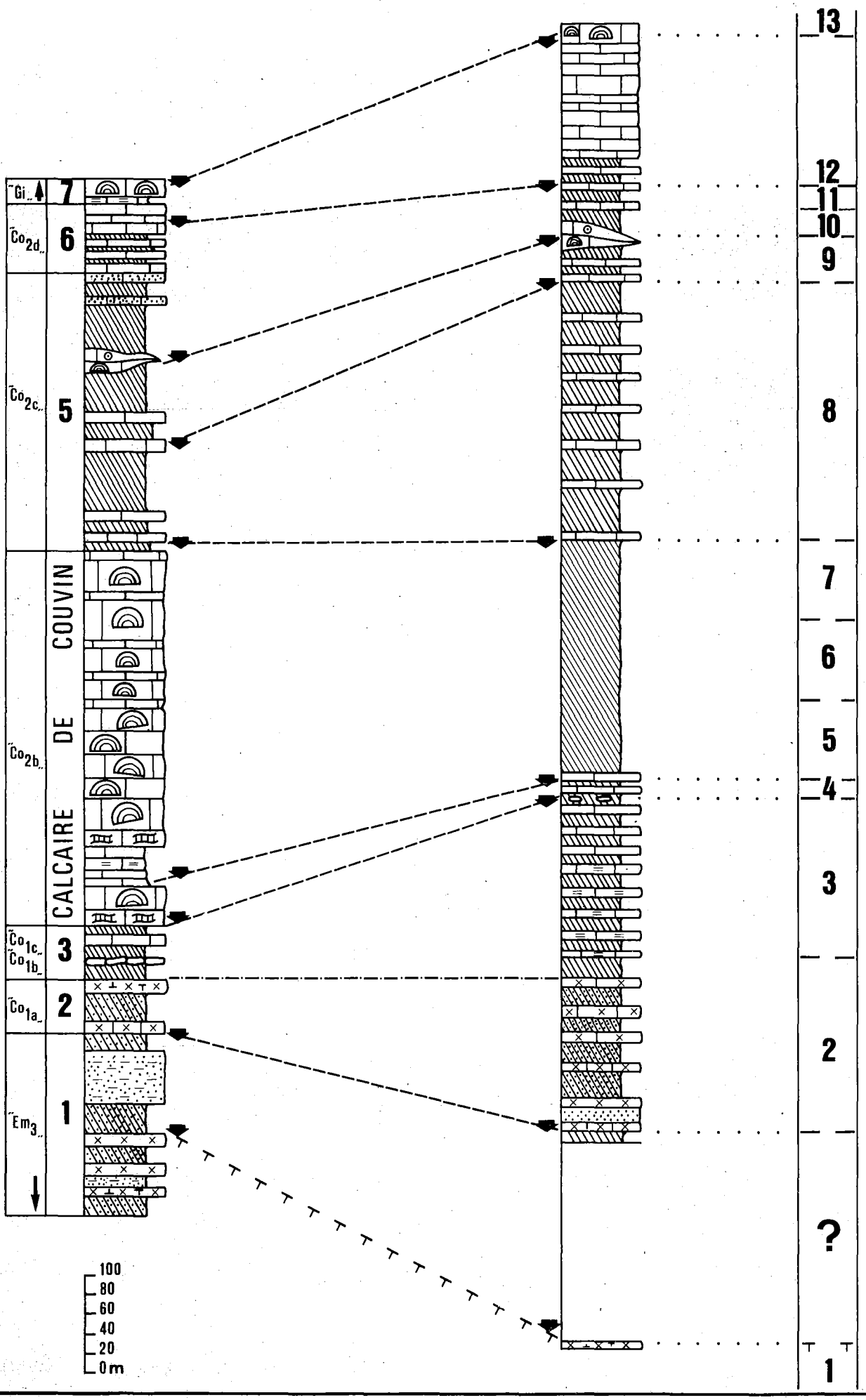
5

ALPHABETIC LIST OF CITED CONODONT FORM SPECIES

- Icriodus aff. I. bilatericrescens beckmanni ZIEGLER W.,1956 (= Icriodus cf. latericrescens bilatericrescens ZIEGLER - BULTYNCK P., 1970; pl. 29, fig. 1)
- Icriodus corniger WITTEKINDT H.P. 1965 (p. 629; pl. 1, fig. 9 - 12).
- Icriodus aff. I. corniger WITTEKINDT 1965 - BULTYNCK,P. 1972 (p. 76; fig. 6, B).
- Icriodus culicellus BULTYNCK,P. 1974 (in press) (= Icriodus aff. I. angustus STEWART & SWEET 1956 - BULTYNCK P. 1972; p. 74 - 75; fig. 3).
- Icriodus curvirostratus BULTYNCK,P. 1970 (Icriodus nodosus curvirostratus : p. 108; pl. III, fig. 2 - 4, 8 - 9; pl. IV, fig. 1, 5, 6).
- Icriodus expansus BRANSON,E.B. & MEHL,M.G. 1938 (p. 164; pl. 26 fig. 18 - 21).
- Icriodus fusiformis CARLS,P. & GANDL,J. 1969 (pp.186 - 187; pl. 17, fig. 17 - 19.)
- Icriodus aff. I. fusiformis CARLS & GANDL, 1969 - BULTYNCK,P. 1972 (p. 77 ; fig. 7, A).
- Icriodus introlevatus BULTYNCK,P. 1970 (Icriodus symmetricus introlevatus : pp. 113 - 114; pl. IV , fig. 7 - 11; pl. V, fig. 1 - 2).
- Icriodus obliquimarginatus BISCHOFF,G. & ZIEGLER,W. 1957 (p. 62; pl. 6, fig. 14).
- Icriodus aff. I. obliquimarginatus BISCHOFF & ZIEGLER 1957 - BULTYNCK,P. 1972 (p. 81; fig. 13, C - D).
- Icriodus rectirostratus BULTYNCK,P. 1970 (Icriodus nodosus rectirostratus : pp. 107 - 108; pl. III, fig. 1; pl. XXX fig. 7 - 8).
- Icriodus regularicrescens BULTYNCK,P. 1970 (pp. 111 - 112, pl. VII fig. 1 - 7; pl. VIII fig. 2, 4, 7, 8).
- Icriodus retrodepressus BULTYNCK,P. 1970 (pp. 110 - 111, pl. XXX fig. 1 - 6)

- Polygnathus angusticostatus WITTEKINDT, H.P. 1965(p. 631, pl. 1 fig. 15-18).
- Polygnathus angustipennatus BISCHOFF, G. & ZIEGLER W. 1957 (p. 85; pl.2 fig. 16; pl. 3 fig. 1 - 3).
- Polygnathus costatus costatus KLAPPER, G. 1971 (p. 63, pl. 1 fig. 30 - 36; pl. 2 fig. 1 - 7).
- Polygnathus costatus patulus KLAPPER, G., 1971 (pp. 62 - 63 ; pl. 1 fig. 1 - 9; pl. 3 fig. 16 - 18).
- Polygnathus eiflius BISCHOFF, G. & ZIEGLER, W. 1957 (Polygnathus eiflia : pp. 89 - 90 ; pl. 4 fig. 5 - 7).
- Polygnathus intermedius BULTYNCK, P. 1970 (pp. 133 - 134; pl. 18 fig. 2 - 6)
- Polygnathus aff. P. kockelianus BISCHOFF, G. & ZIEGLER, W. 1957 (= Polygnathus cf. kockeliana BISCHOFF & ZIEGLER - BULTYNCK, P. 1970; pl. 15, fig. 6 - 7).
- Polygnathus linguiformis cooperi KLAPPER, G. 1971 (p. 64; pl. 1 fig. 17-22; pl. 2 fig. 21).
- Polygnathus aff. P. linguiformis cooperi KLAPPER, G. 1971 (= Polygnathus linguiformis linguiformis HINDE, forma β - BULTYNCK P. 1970; pp. 125 - 127; pl. 10, fig. 3, 6, 7, 8).
- Polygnathus linguiformis linguiformis HINDE, G.J. 1879 (p. 367; pl. 17 fig. 15).
- Polygnathus linguiformis linguiformis HINDE, G.J. 1879 forma α BULTYNCK P. 1970 (p. 126; pl. IX fig. 1 - 7).
- Polygnathus linguiformis linguiformis HINDE, G.J. 1879 forma γ BULTYNCK P. 1970 (pp. 126 - 127; pl. XI fig 1 - 6 ; pl. XII fig. 1 - 6).
- Polygnathus pseudofoliatus WITTEKINDT, H.P. 1965 (Polygnathus pseudofoliata : p. 637; pl. 2 fig. 19, 23).
- Polygnathus aff. P. robusticostatus BISCHOFF, G. & ZIEGLER, W. 1957 (= Polygnathus cf. robusticostata BISCHOFF & ZIEGLER 1957 - BULTYNCK, P. 1970; p. 128 - 129; pl. 16, fig. 4 - 5; pl. 17 fig. 1 - 2).

- Polygnathus trigonicus BISCHOFF,G.& ZIEGLER,W. 1957 (Polygnathus trigonica : pp. 97 - 98; pl. 5 fig. 1 - 6).
- Polygnathus varcus group. KLAPPER,G., PHILIP G. M. & JACKSON,J.H. 1970 (p. 651) (= partim Polygnathus xyla STAUFFER 1940 - BULTYNCK,P. 1970; pl. 15, fig. 2, 8).
- Spathognathodus bidentatus BISCHOFF,G. & ZIEGLER,W. 1957 (pp. 114 - 115; pl. 6 fig. 8a - b, 9a - b, 10a - b (11a - b, 12, 13) ?).
- Spathognathodus bipennatus BISCHOFF,G. & ZIEGLER,W. 1957 (pp. 115 - 116; pl. 21 fig. 31 a - b - c).
- Spathognathodus aff. S. bipennatus BISCHOFF,G. & ZIEGLER,W. 1957 (= Spathognathodus cf. bipennatus BISCHOFF & ZIEGLER 1957 - BULTYNCK,P. 1970; p. 134; pl. 18 fig. 9; pl. 19, fig. 1 - 5).


COUVIN——45 km——HALMA-WELLIN M.g.m.
Gi
Co2d
Co2c
Co2b
Co1c
Co1b
Co1a
Em3
7
6
5
3
2
1
DE COUVIN
CALCAIRE
13
12
11
10
9
8
7
6
5
4
3
2
?
1
100
80
60
40
20
0 m

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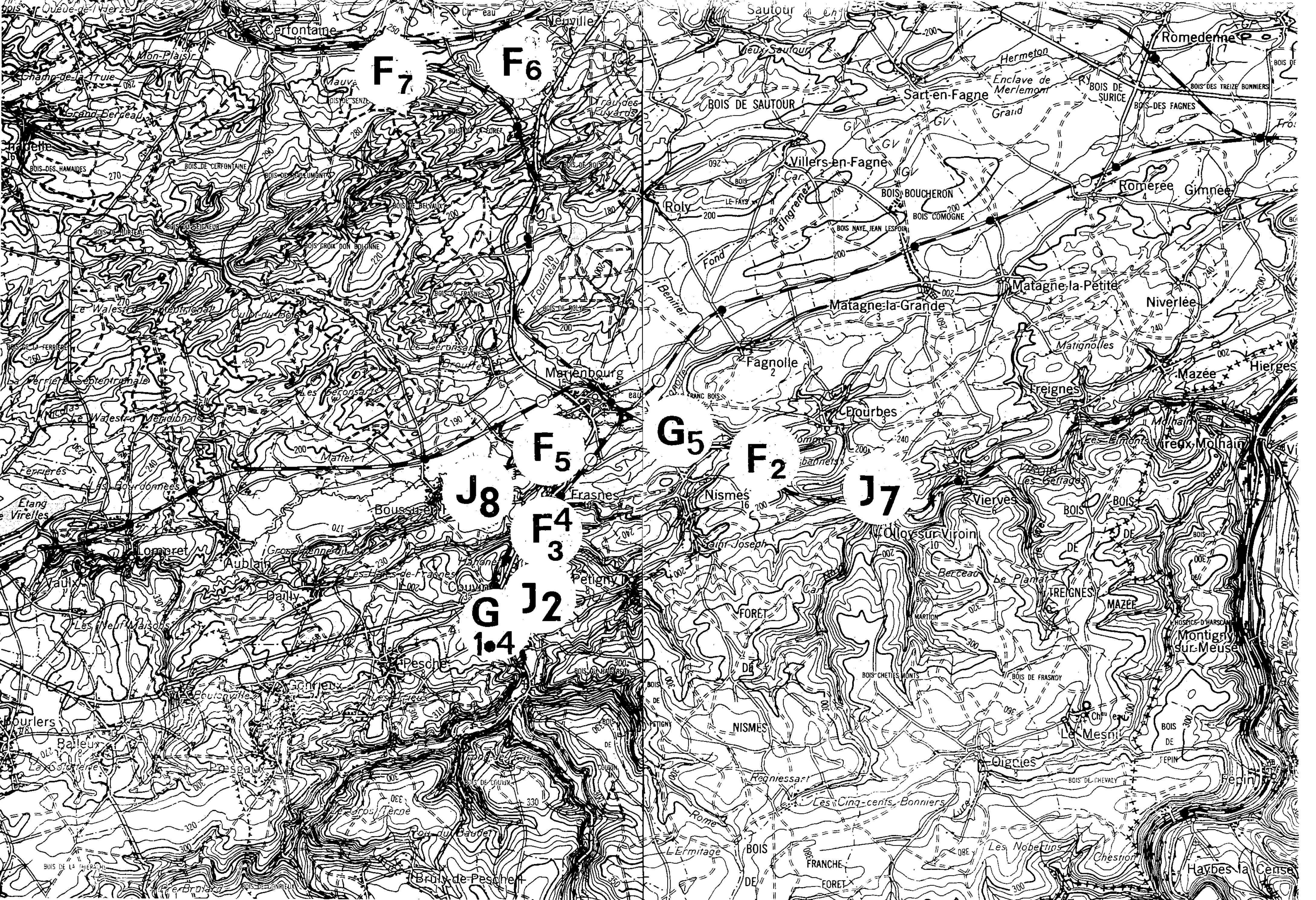
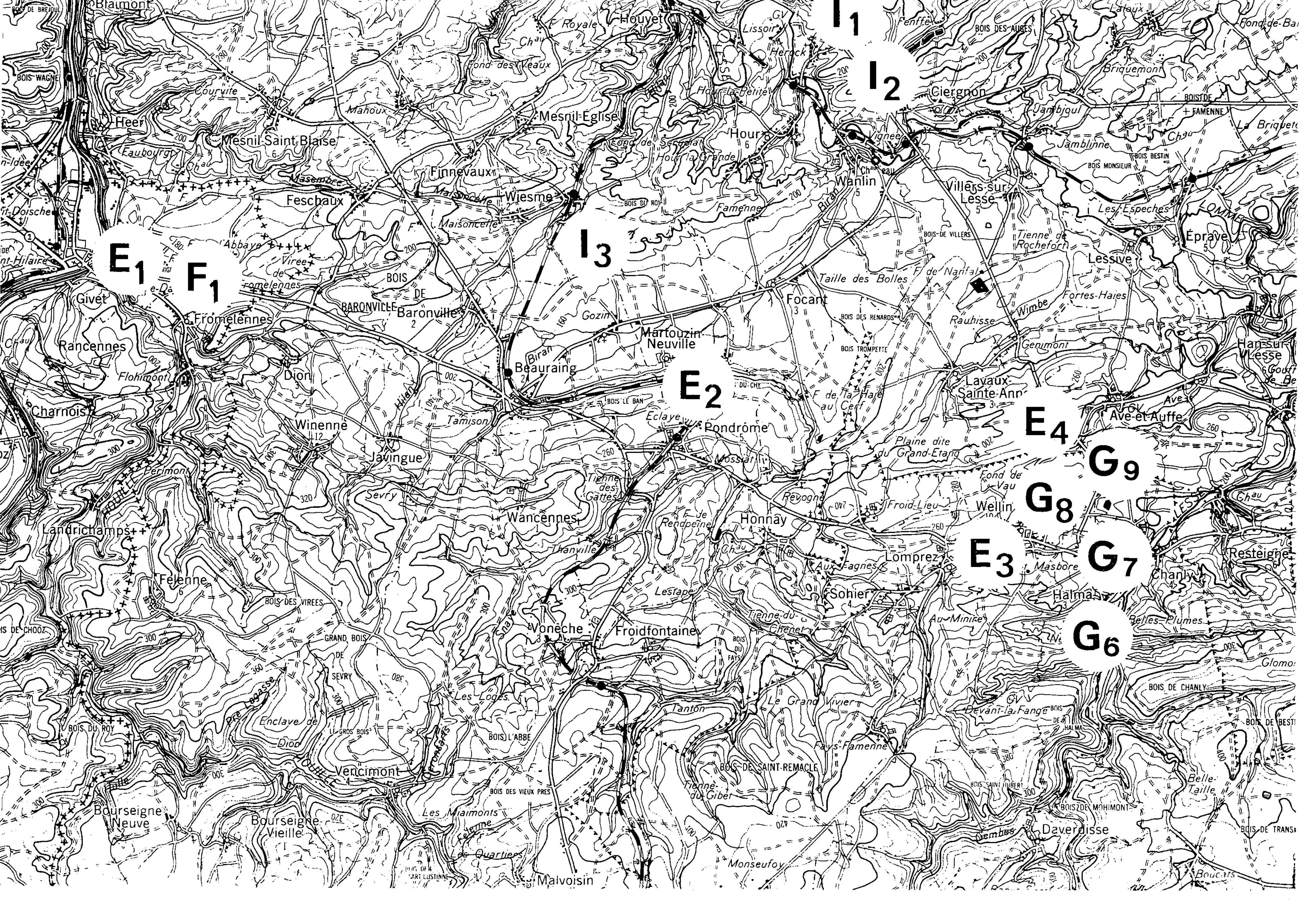
CORRIGENDA

- On the tectonic section HALMA 1 G (6) a the boundary "Em3" - "Cola" has to be traced at m 27 and not at m 41 as indicated.

- On Log HALMA 2 G (6) b : for Icriodus aff. T. bilatericrescens beckmanni, please read Icriodus aff. I. bilatericrescens beckmanni.

- On Log WELLIN - FOND DES VAUX 1 G (8) C :
  for Polygnathus linguiformis read Polygnathus linguiformis linguiformis forma γ
  for linguiformis forma γ read Polygnathus angustipennatus
  for Polygnathus angustipennatus read Polygnathus angusticostatus.


F7
F6
F5
F4
F3
F2
G5
J8
J7
J2
G
1•4
Cerfontaine
Neuville
Sautour
Romedenne
Sart-en-Fagne
BOIS DE SAUTOUR
Villers-en-Fagne
Roly
Romerée
Gimnée
Matagne-la-Petite
Matagne-la-Grande
Niverlée
Fagnolle
Mariembourg
Dourbes
Treignes
Mazée
Hierges
Nismes
Frasnes
Boussu-en-Fagne
Vierves
Olloy-sur-Viroin
Petigny
Couvin
Aublain
Dailly
Lompret
Vaulx
Pesche
Presgaux
Bourlers
Baileux
Oignies
Le Mesnil
Montigny-sur-Meuse
Haybes-la-Censé
Bruly-de-Pesche
BOIS BOUCHERON
BOIS COMOGNE
Enclave de Merlemont
BOIS DES FAGNES
BOIS DE SURICE
Les Cinq-cents Bonniers
FORET
NISMES
FRANCHE
BOIS DE FRASNOY
BOIS DE CHEVALY



I1
I2
I3
E1
F1
E2
E3
E4
G6
G7
G8
G9
Givet
Heer
Mesnil-Saint-Blaise
Mesnil-Eglise
Houyet
Finnevaux
Feschaux
Wiesme
Hour
Wanlin
Ciergnon
Villers-sur-Lesse
Lessive
Éprave
Han-sur-Lesse
Fromelennes
Rancennes
Charnois
Landrichamps
Felenne
Baronville
Dion
Winenne
Javingue
Beauraing
Martouzin-Neuville
Focant
Lavaux-Sainte-Anne
Ave-et-Auffe
Pondrôme
Wancennes
Honnay
Wellin
Lomprez
Sohier
Halma
Chanly
Resteigne
Vonêche
Froidfontaine
Vencimont
Bourseigne-Neuve
Bourseigne-Vieille
Malvoisin
Daverdisse
BOIS DE BARONVILLE
BOIS DE VILLERS
BOIS DES RENARDS
BOIS TROMPETTE
BOIS DES VIREES
GRAND BOIS DE SEVRY
BOIS DE SAINT-REMACLE
BOIS DE CHANLY

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NAMUR 1974

BELGIAN MICROPALEONTOLOGICAL LIMITS

FROM EMSIAN TO VISEAN – SEPTEMBER 1st to 10th

EXCURSION H

Guides :

CONIL R. (leader)

GROESSENS E.

STREEL M.

GUIDEBOOK

Edited by

J. BOUCKAERT & M. STREEL

ETROEUNGT H① (M.g.m.47-49)

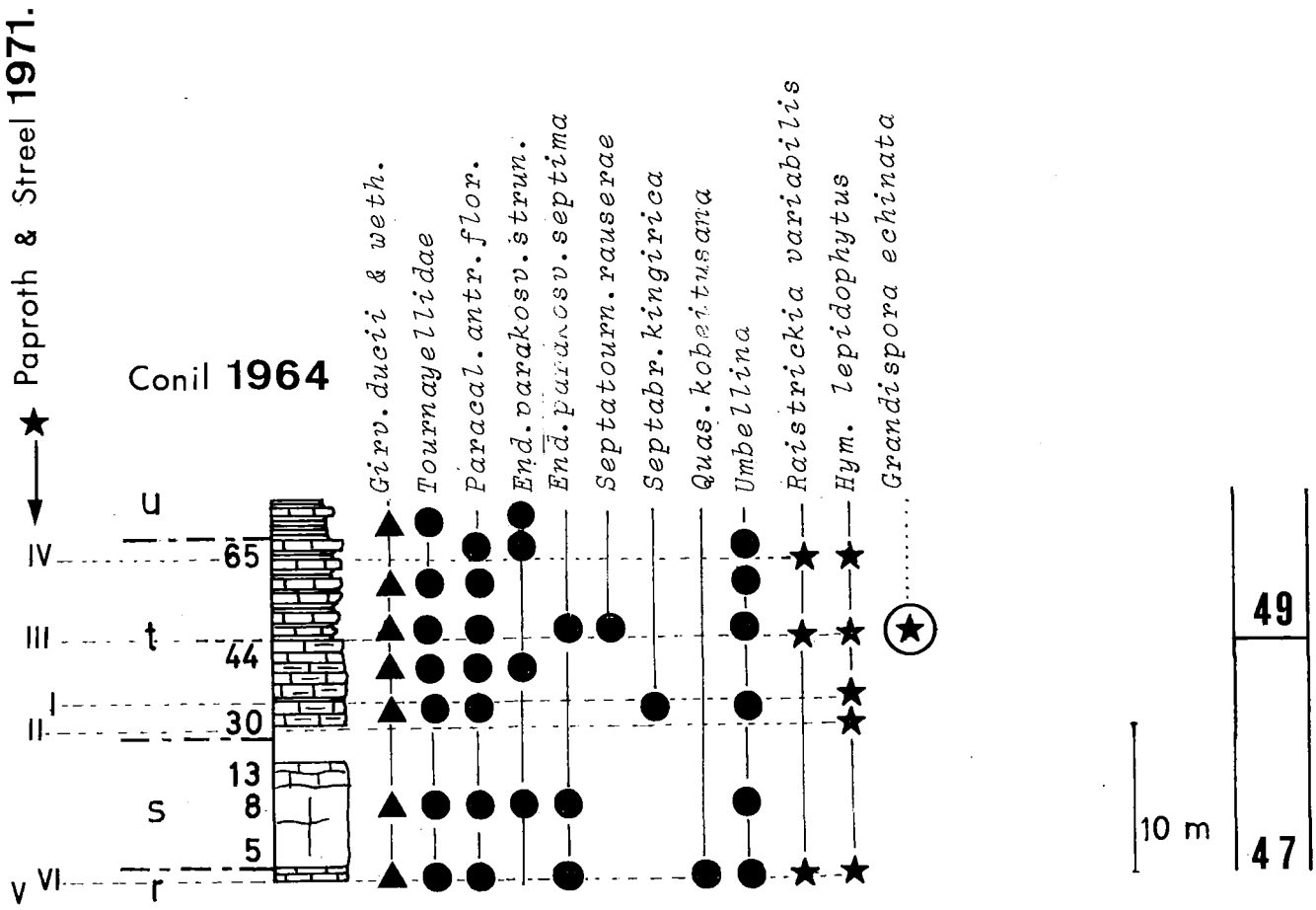
1964. R.CONIL, M.LYS & E.PAPROTH, Acad.roy.Belg.Cl.Sc.Mém.4°,2,XV, 4, pp.1-21, pl.I (Bibliogr.).

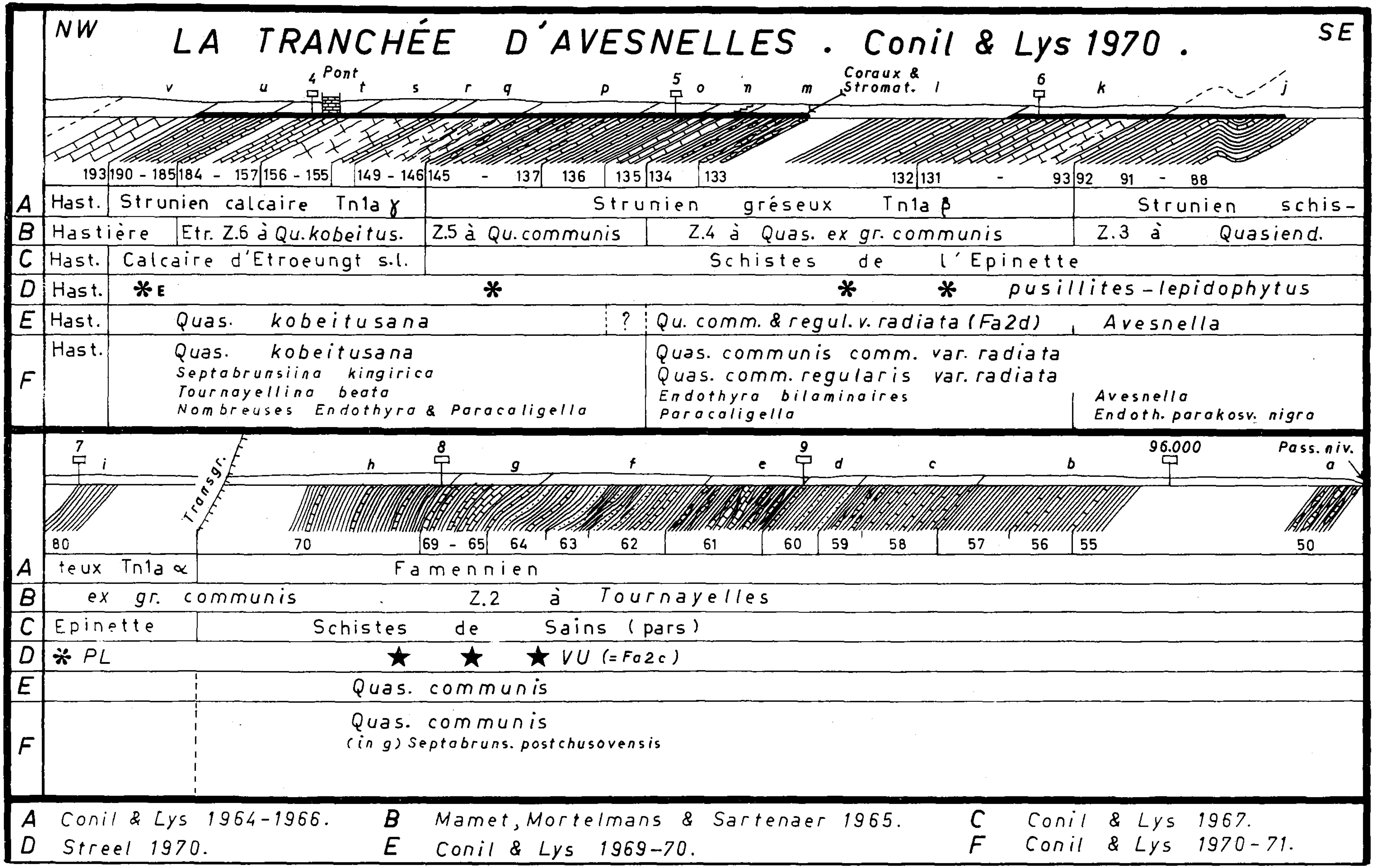
1964. P.SARTENAER & B.MAMET, C.R. Ve Congr.intern.Strat.Géol.Carb. Paris 1963, II, p.755-761.

1965. B.MAMET, G.MORTELMANS & P.SARTENAER, Bull.Soc.belge Géol., LXXIV, pp.41-51.

1974. R.CONIL, Ann.Soc.géol.Nord,C.R.Exc.3 juin 1973.

(cf.bibliogr.Avesnelles).




NW
LA TRANCHÉE D'AVESNELLES . Conil & Lys 1970 .
SE
v u 4 Pont t s r q p 5 o n m Coraux & Stromat. l 6 k j
193 190 - 185 184 - 157 156 - 155 149 - 146 145 - 137 136 135 134 133 132 131 - 93 92 91 - 88
A Hast. Strunien calcaire Tn1a γ Strunien gréseux Tn1a β Strunien schis-
B Hastière Etr. Z.6 à Qu. kobeitus. Z.5 à Qu. communis Z.4 à Quas. ex gr. communis Z.3 à Quasiend.
C Hast. Calcaire d'Etroeungt s.l. Schistes de l'Epinette
D Hast. * E * * * pusillites – lepidophytus
E Hast. Quas. kobeitusana ? Qu. comm. & regul. v. radiata (Fa2d) Avesnella
F Hast. Quas. kobeitusana
Septabrunsiina kingirica
Tournayellina beata
Nombreuses Endothyra & Paracaligella
Quas. communis comm. var. radiata
Quas. comm. regularis var. radiata
Endothyra bilaminaires
Paracaligella
Avesnella
Endoth. parakosv. nigra
7 i Transgr. h 8 g f e 9 d c b 96.000 Pass. niv. a
80 70 69 - 65 64 63 62 61 60 59 58 57 56 55 50
A teux Tn1a α Famennien
B ex gr. communis Z.2 à Tournayelles
C Epinette Schistes de Sains (pars)
D * PL ★ ★ ★ VU (= Fa2c)
E Quas. communis
F Quas. communis
(in g) Septabruns. postchusovensis
A Conil & Lys 1964-1966. B Mamet, Mortelmans & Sartenaer 1965. C Conil & Lys 1967.
D Streel 1970. E Conil & Lys 1969-70. F Conil & Lys 1970-71.

AVESNELLES H②a

1964. R.CONIL, M.LYS & E.PAPROTH, Acad.roy.Belg.,Cl.Sc.,Mém.4°, 2, XV, 4, pp.21-23, pls.I,II, pp.167-178.

1965. B.MAMET, G.MORTELMANS & P.SARTENAER, Bull.Soc.belge Géol. LXXIv, fig.2,I.

1967. M.BOURDON, A.FEDAIEVSKY & A.MAURIN, Intern.Symp.Dev.Syst. Calgary, pp.465-471.

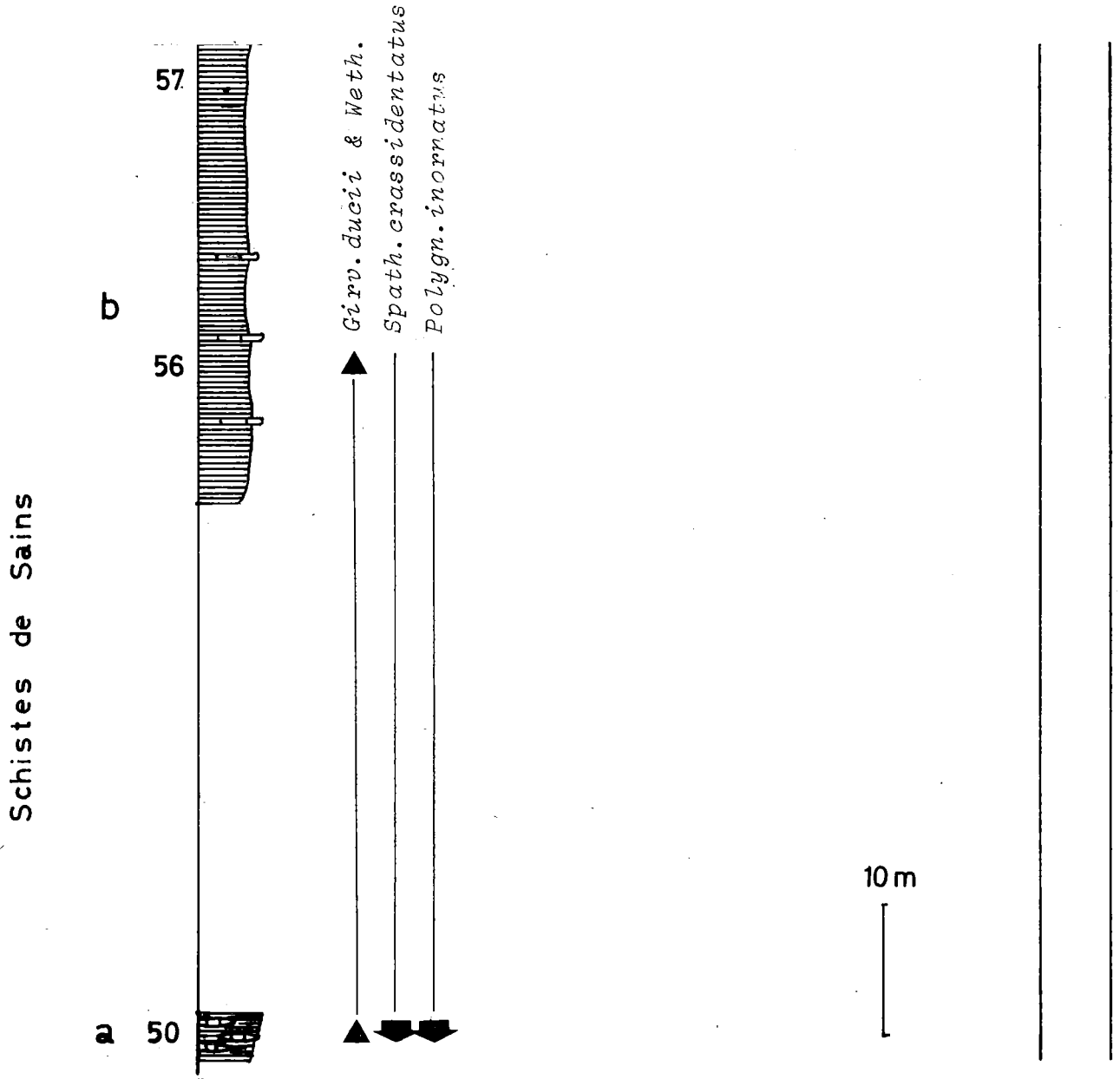
1970. R.AUSTIN, R.CONIL, G.DOLBY, M.LYS, E.PAPROTH, F.RHODES, M.STREEL, J.UTTING, D.WEYER., Congr.Coll.Univ.Liège, 55 Strat.Carb., p.167, h.t.II.

1970. R.CONIL, M.LYS, Congr.Coll.Univ.Liège, 55, Strat.Carb., pp.241-265.

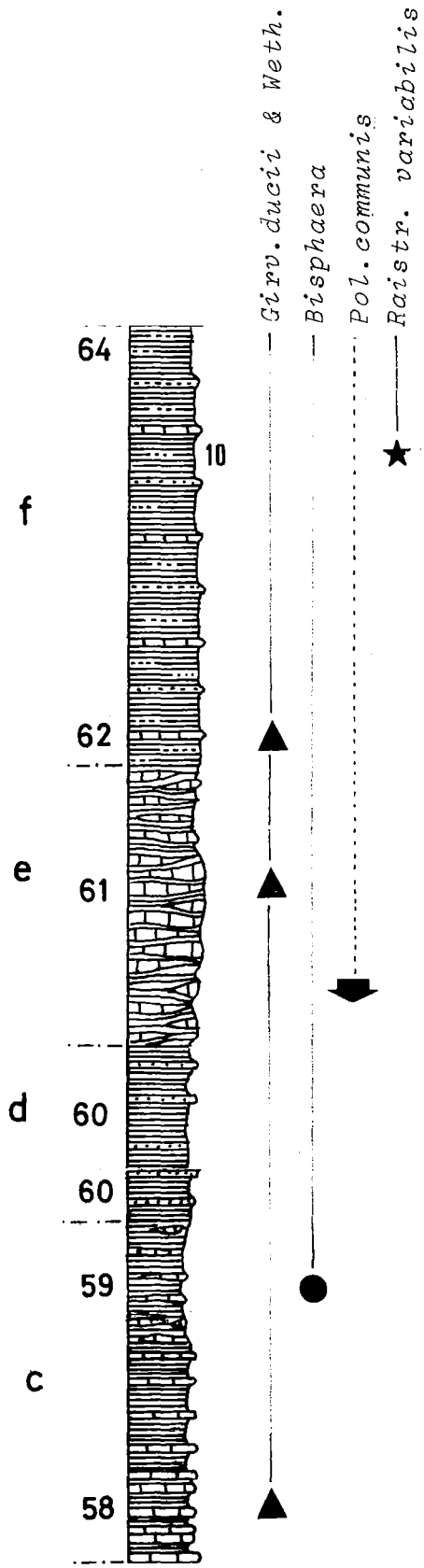
1972. R.CONIL & G.VANDEVEN, Prof.Paper Serv.géol.Belg.,n°1, fig.8.

1974. F.LETHIERS, C.R.Acad.Sc.Paris, 278, D, pp.1015-1017.

1974. R.CONIL, Ann.Soc.géol.Nord, C.R.Excurs. 3 juin 1973.



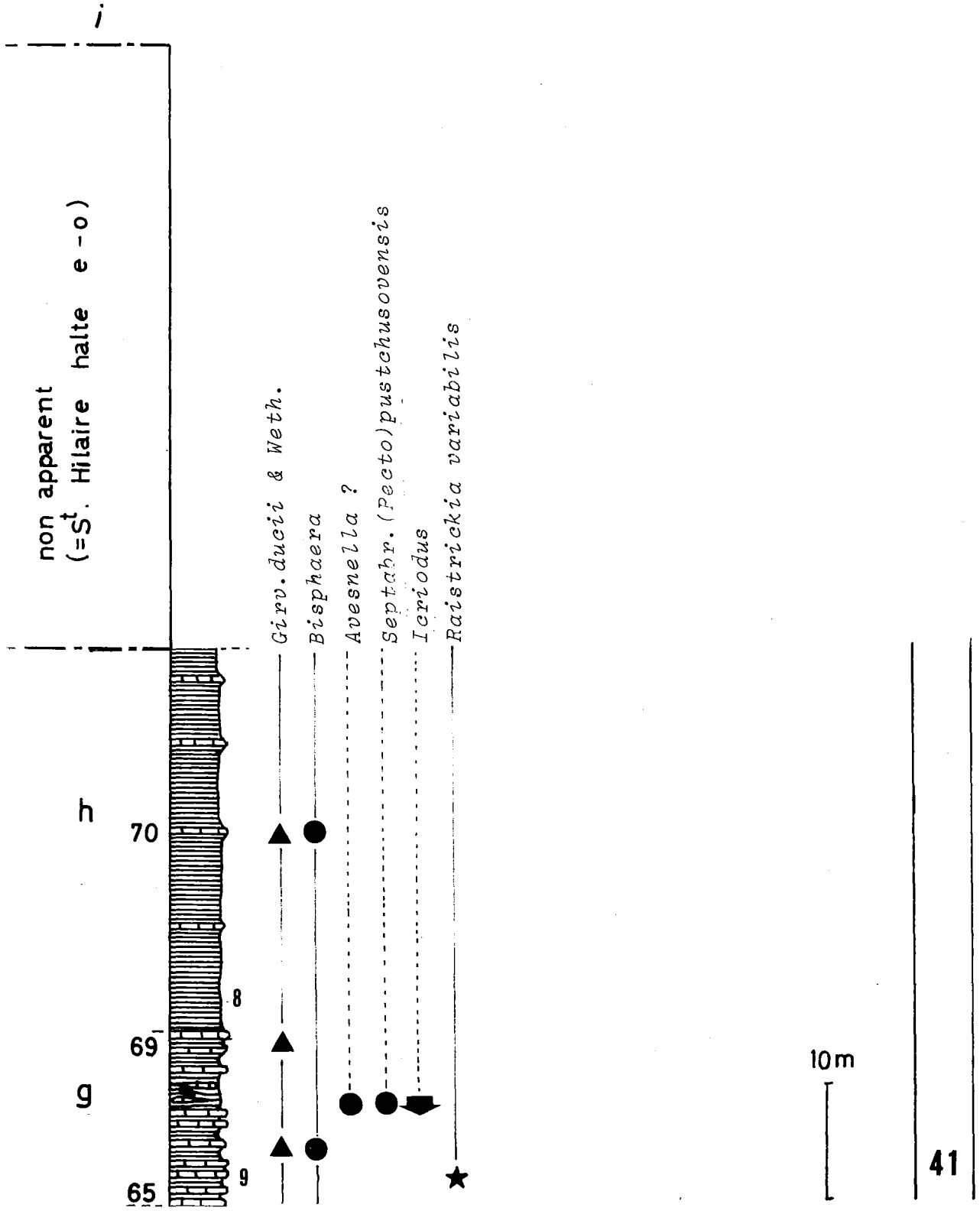
H②b(M.g.m.41)


Giv. ducii & Weth.
Bisphaera
Pol. communis
Raistr. variabilis
64
10
f
62
e
61
d
60
60
59
c
58

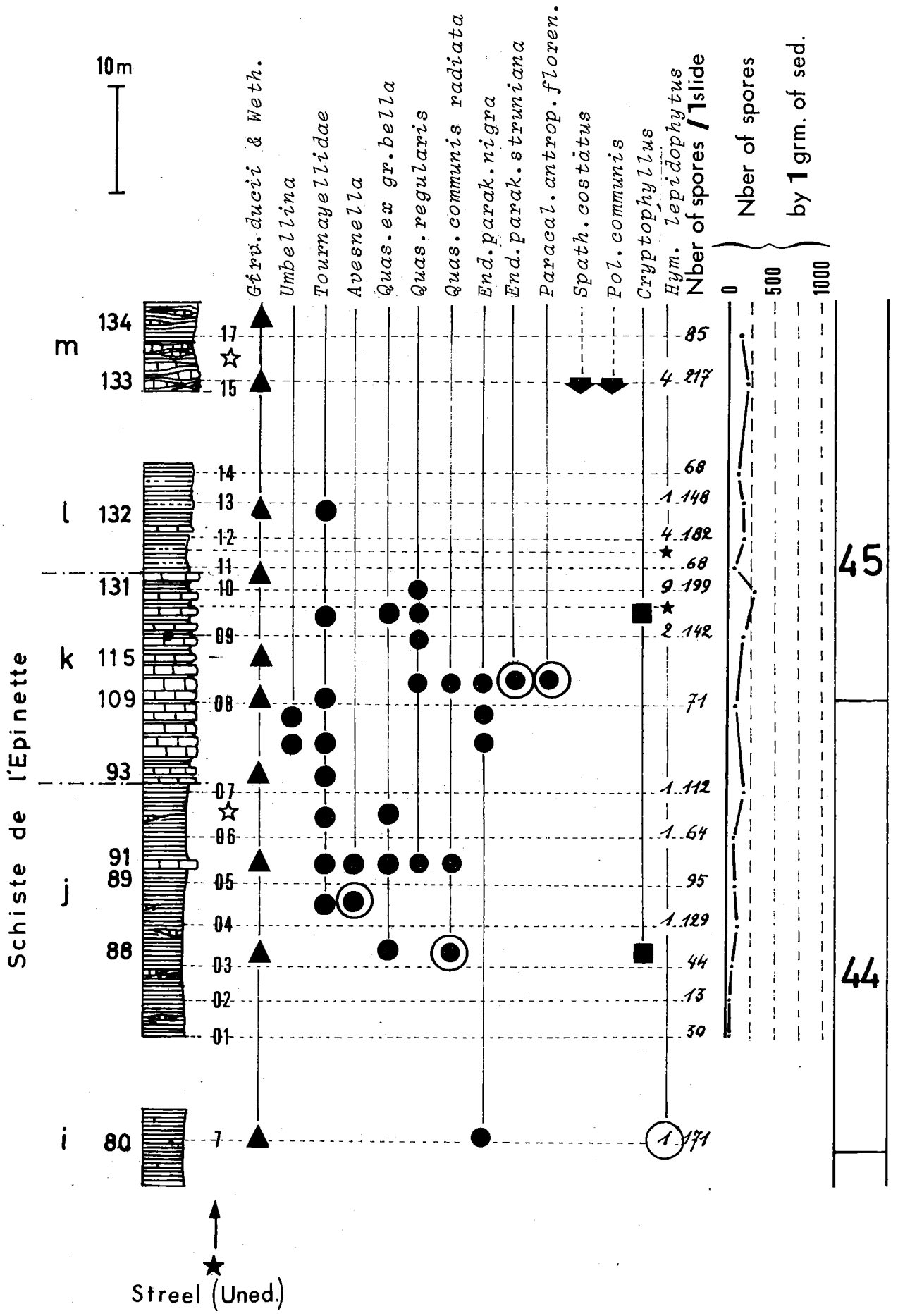

41


10m

H②c(M.g.m.41)

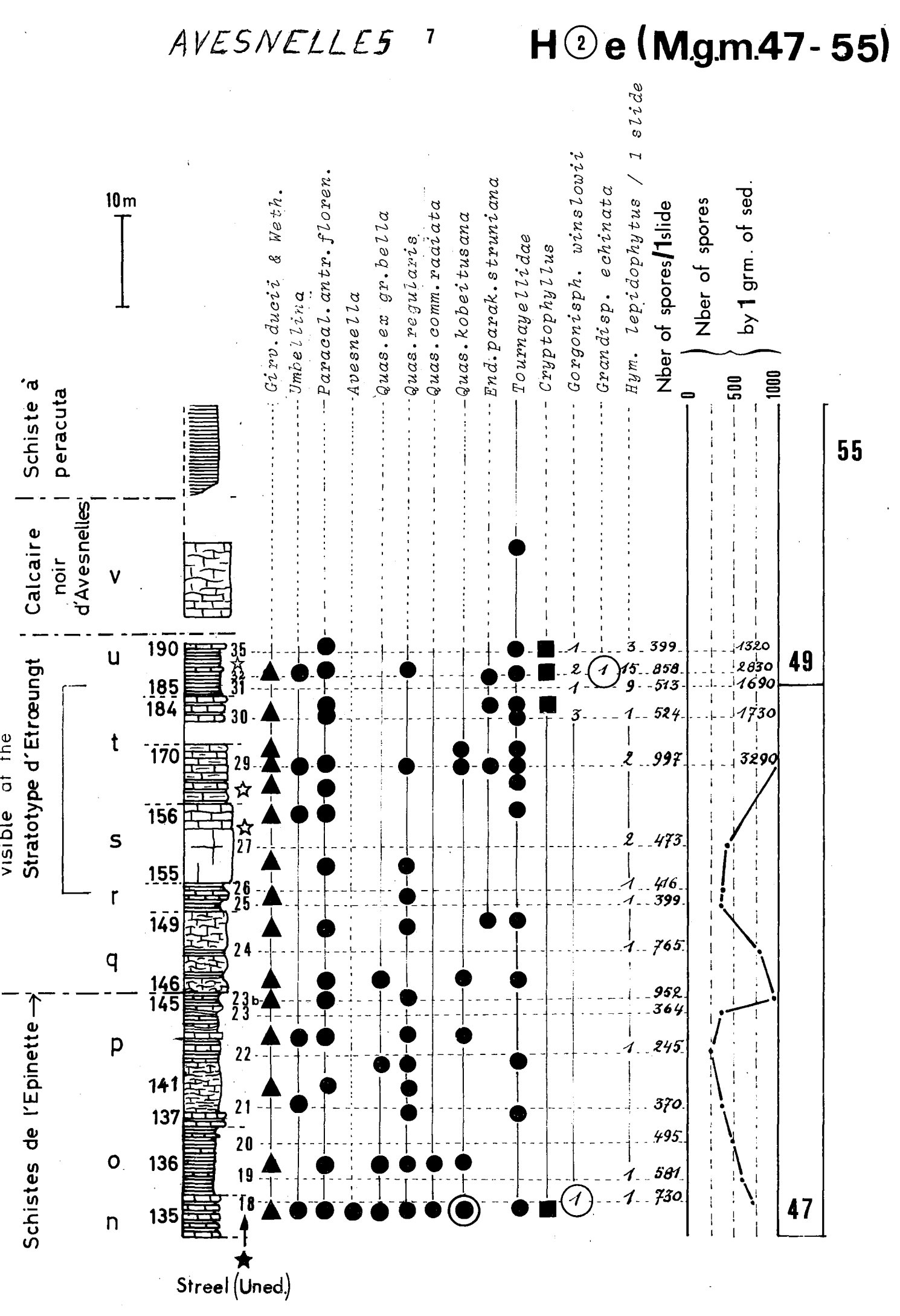

i
non apparent
(=St. Hilaire halte e-o)
h
g
70
69
65
8
9
Giv. ducii & Weth.
Bisphaera
Avesnella ?
Septabr. (Pecto) pustchusovensis
Iriodus
Raistrickia variabilis
10m
41

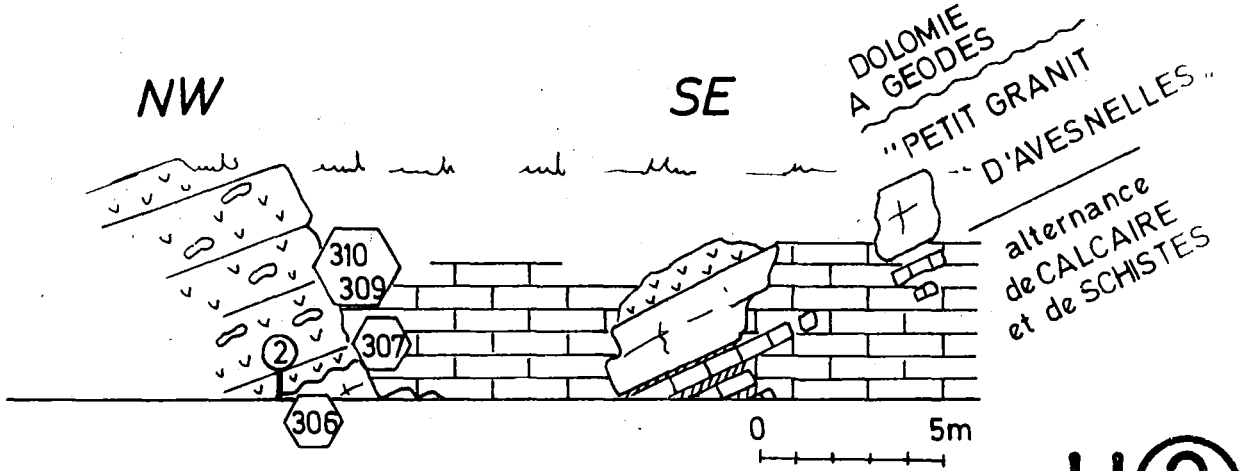
AVESNELLES [6] H ② d (M.g.m. 44 -45)



AVESNELLES 7

H ② e (M.g.m.47-55)





H2

LA TRANCHEE D'AVESNELLES

CAMP CESAR

AVESNELLES

NW SE

Sp. bultyncki

74

70

20

306

Encrini-te d'Aves-nelles

Dolomie à géodes

Alternance de calcaire et de schistes

5m

0

Zone à *Polygnathus communis carina*

Zone à *Siphonodella*

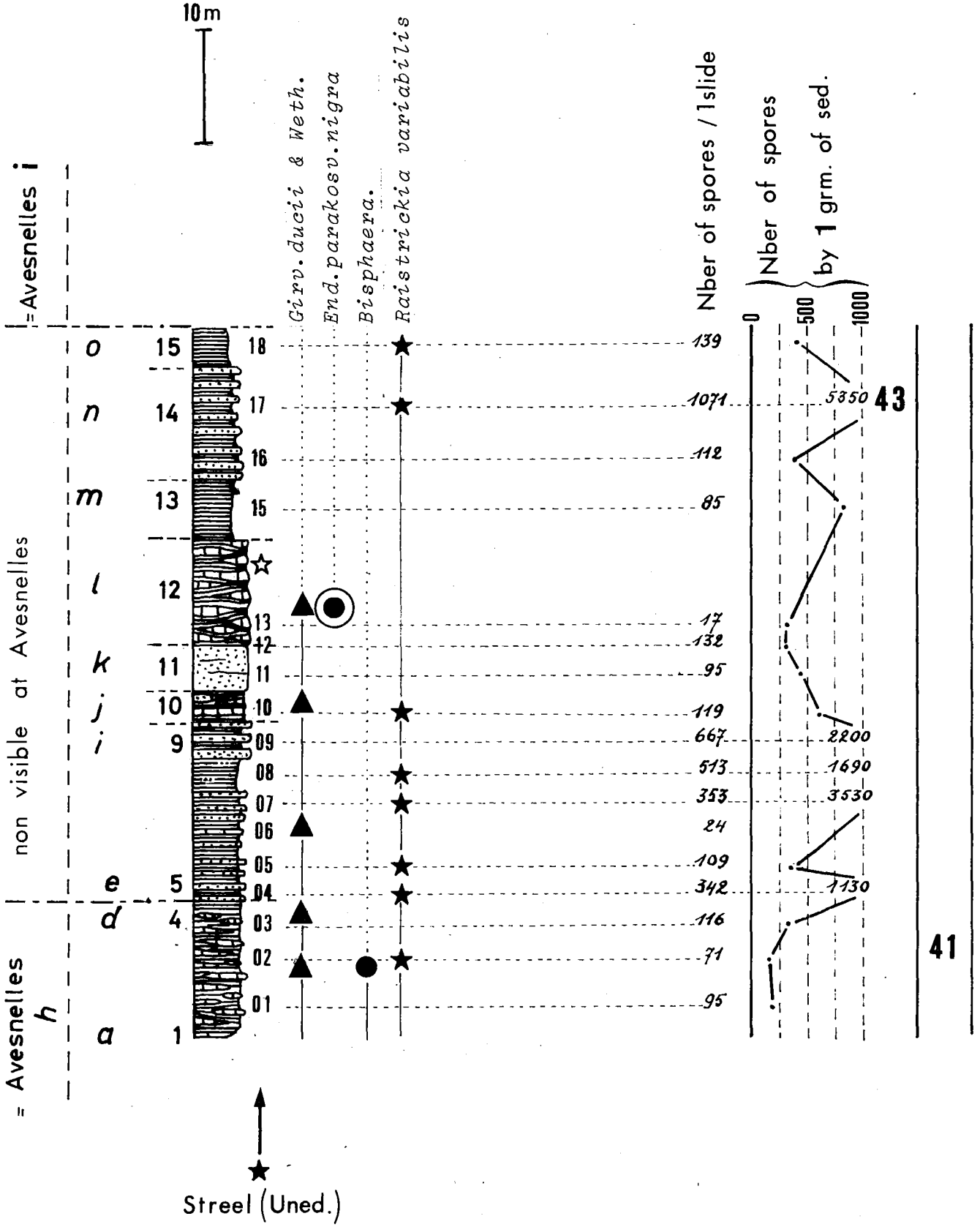
H2

H5

St. HILAIRE HALTE H③ (M.g.m. 41-43)

1964. R.CONIL, M.LYS & E.PAPROTH, Acad.roy.Belg.,Cl.Sc.Mém.4°,2,XV, 4, p.24, pl.I.

1970. R.AUSTIN, R.CONIL, G.DOLBY, M.LYS, E.PAPROTH et al., Cong.Coll. Univ.Liège, 55, Strat.Carb.,pp.167-178.



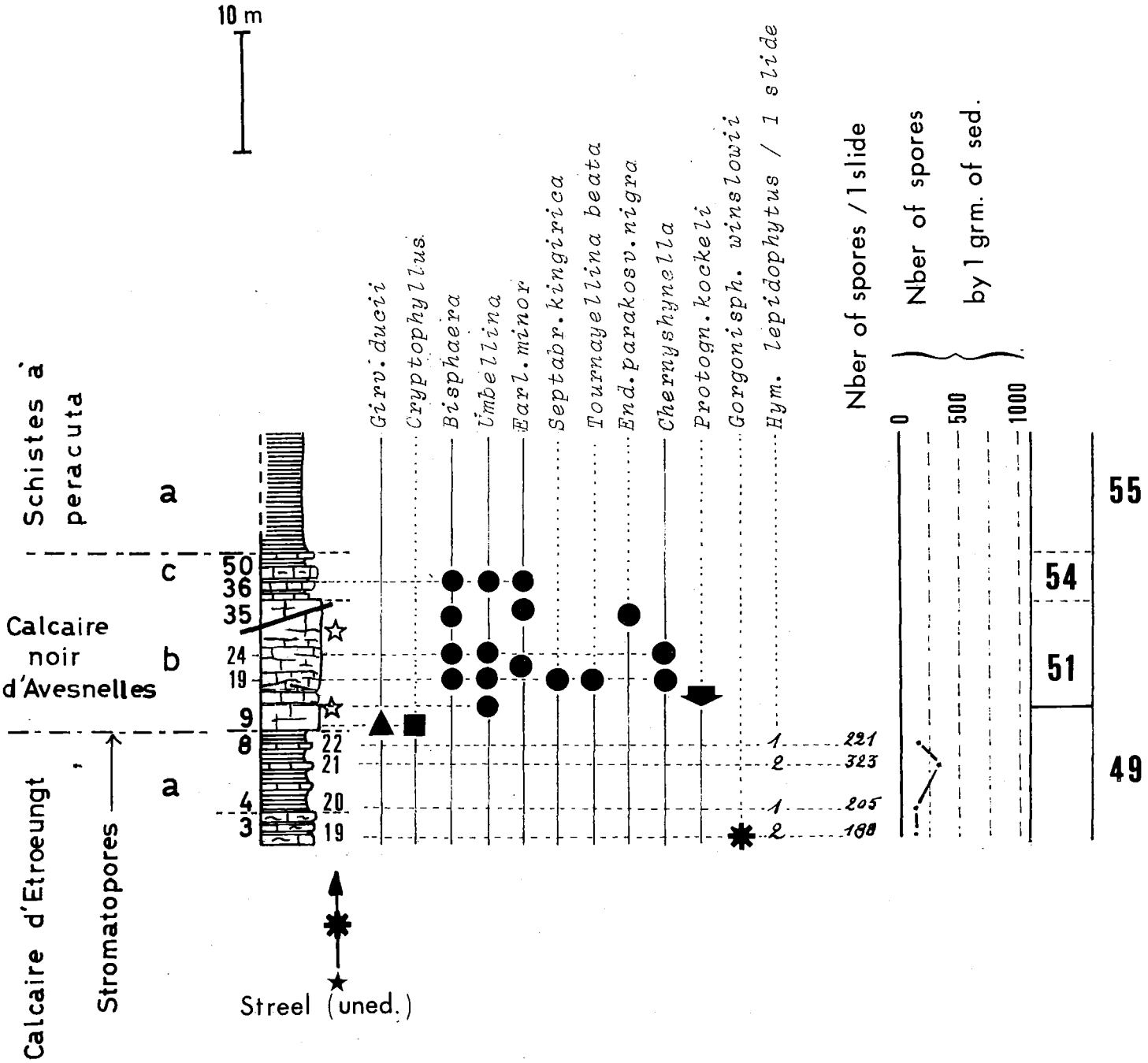
St. HILAIRE VOIE H④ (M.g.m.49-55)

1913. A.CARPENTIER, Mém.Soc.géol.Nord, VII, 2, pp.57-58.

1964. R.CONIL, M.LYS & E.PAPROTH, Acad.roy.Belg., Cl.Sc.Mém.4°, 2, XV, 4, p.24, pl.I.

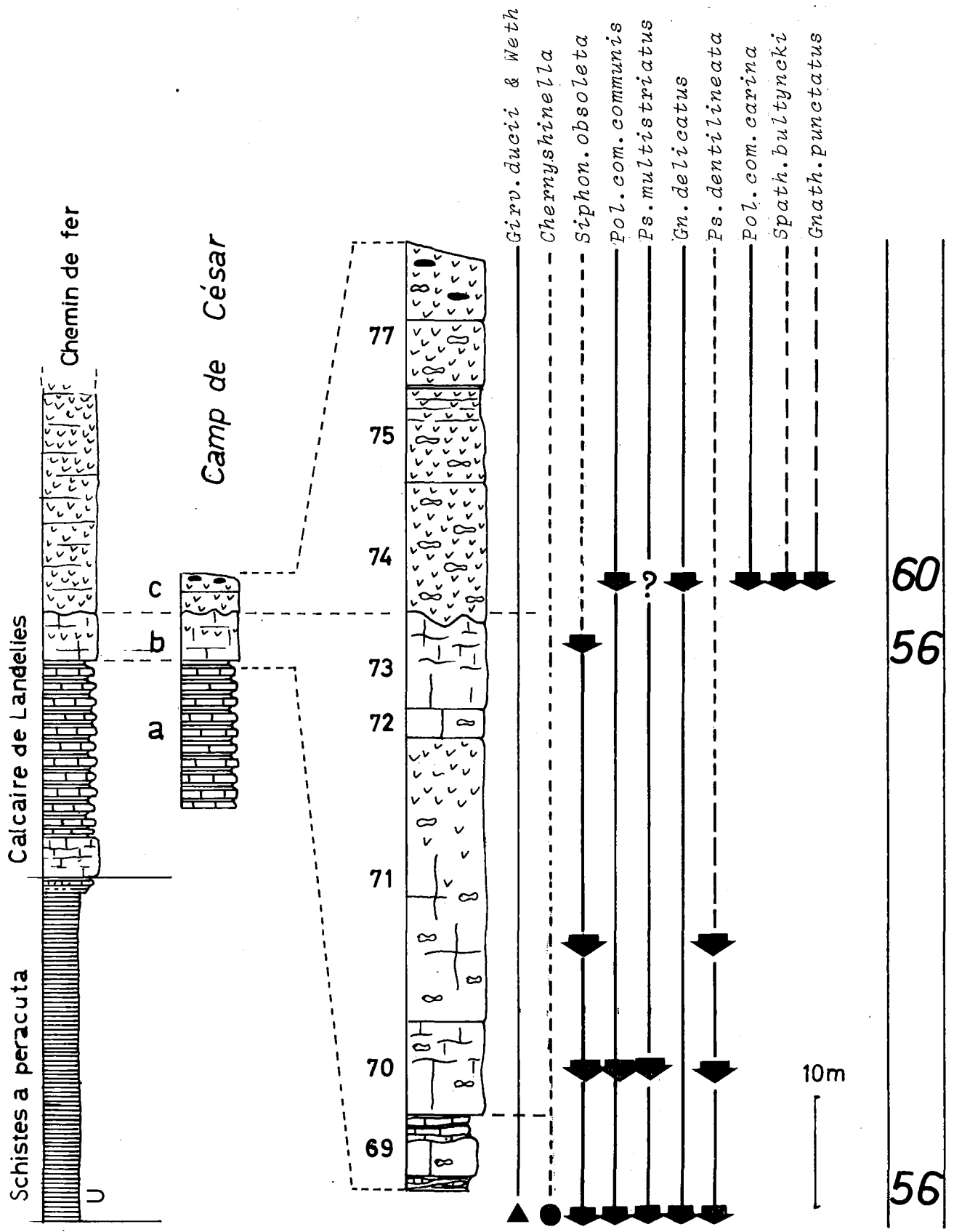
1970. R.AUSTIN, R.CONIL, G.DOLBY, M.LYS, E.PAPROTH et al., Cong.Coll. Univ.Liège, 55, Strat.Carb., pp.167-178.

1970. R.CONIL & M.LYS, ibidem, p.244.



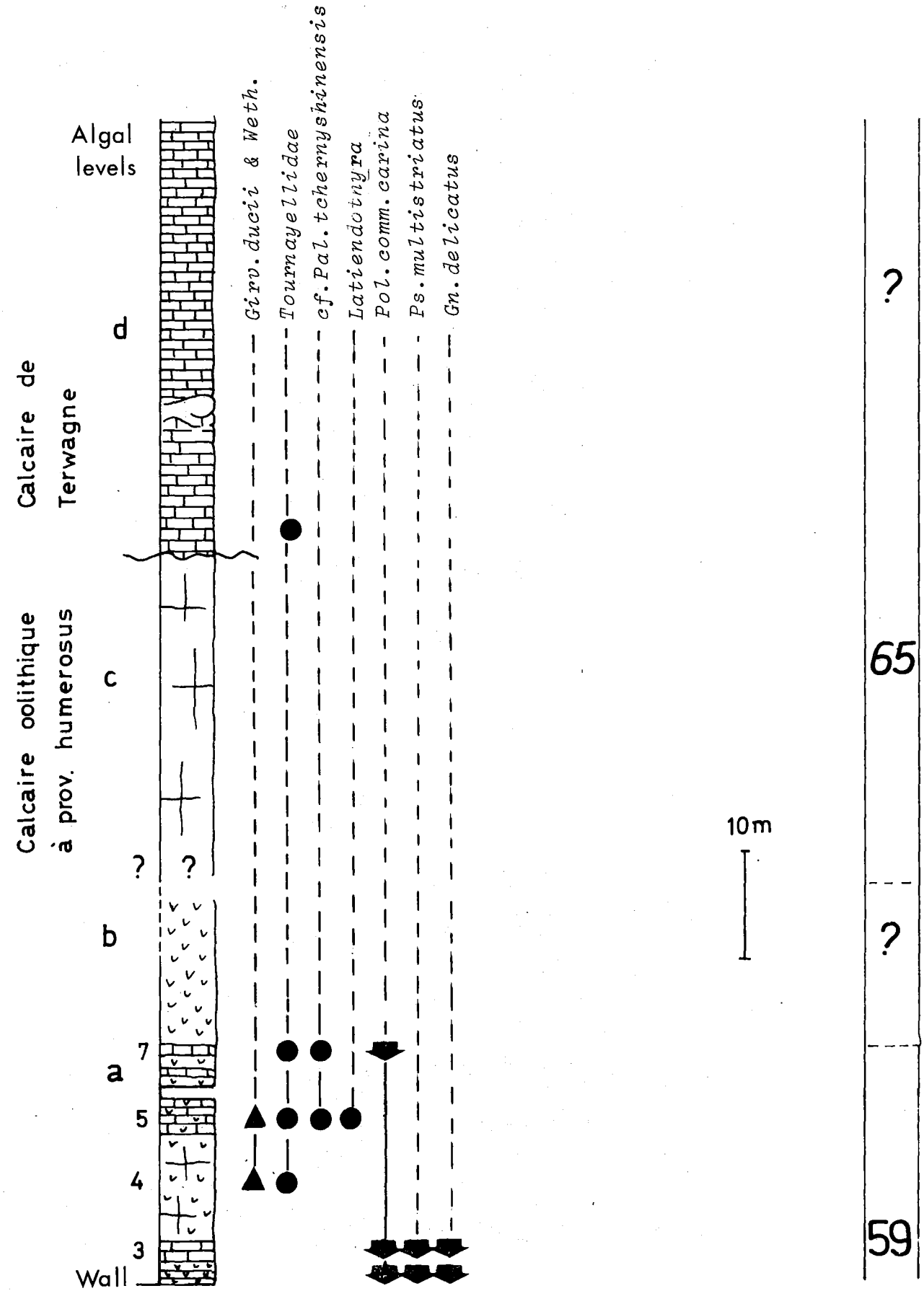
CAMP DE CESAR H⑤ (M.g.m.56-60)

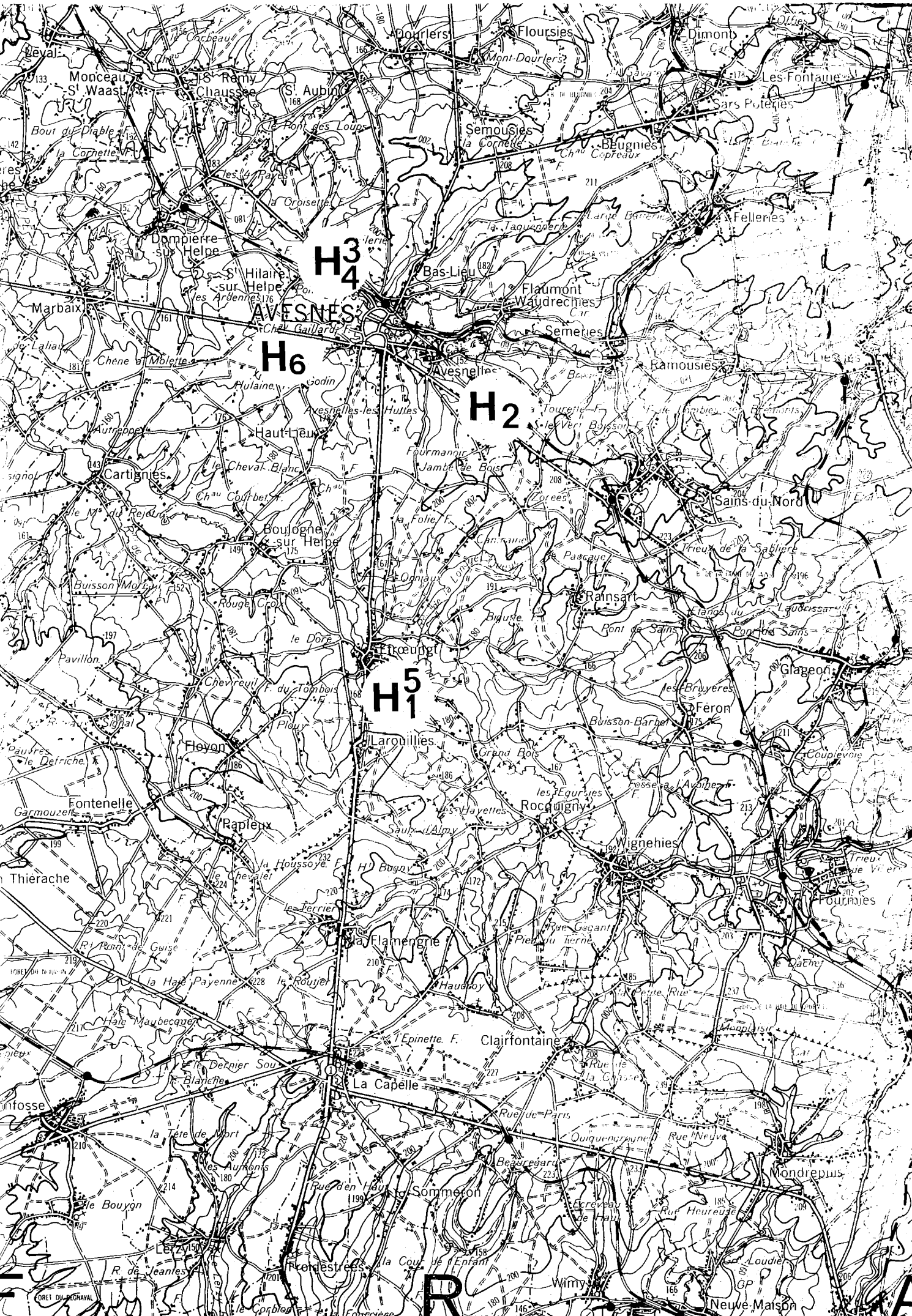
1913. A.CARPENTIER, Mém.Soc.géol.Nord, VII, pp.30-35.
1974. R.CONIL, Ann.Soc.géol.Nord (C.R.exc.3 juin 1973).



GODIN H⑥a (M.g.m.59-65

1913. A.CARPENTIER, Mém.Soc.géol.Nord,VII,pp.44-49, figs.48,49 (p.21)
1974. R.CONIL, Ann.Soc.géol.Nord (C.R.exc.3juin 1973).




H$_4^3$
H$_6$
H$_2$
H$_1^5$
AVESNES
Dourlers
Floursies
Dimont
Les Fontaines
Sars Poteries
Monceau St Waast
St Remy Chaussée
St Aubin
Semousies
Beugnies
Felleries
Dompierre sur Helpe
St Hilaire sur Helpe
Bas-Lieu
Flaumont Waudrechies
Marbaix
Semeries
Ramousies
Avesnelles
Haut-Lieu
Cartignies
Sains-du-Nord
Boulogne sur Helpe
Rainsart
Trieux de la Sablière
Trœungt
Glageon
Féron
Floyon
Larouillies
Fontenelle
Rocquigny
Rapleux
Wignehies
Thiérache
Fourmies
la Flamengrie
Clairfontaine
La Capelle
Mondrepuis
Sommeron
Wimy
Neuve-Maison
FORET DU REGNAVAL

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INTERNATIONAL SYMPOSIUM ON

NAMUR 1974

BELGIAN MICROPALEONTOLOGICAL LIMITS

FROM EMSIAN TO VISEAN – SEPTEMBER 1st to 10th

EXCURSION I

Guides :

BOUCKAERT J.,

COEN M. (leader),

COEN - AUBERT M.,

DUSAR M.

GUIDEBOOK

Edited by

J. BOUCKAERT & M. STREEL

HOUYET 5

P. SARTENAER, 1970 (concerns Rhynchonellids succession ; his point Houyet 25135, section Pl. I)

Conodonts show the transition between the Upper gigas and the triangularis-Zone and the three subdivisions of the latter.

The Upper gigas-Zone is marked only by the presence of Palmatolepis subrecta. Palmatolepis delicatula appears at 24 m and occurs regularly above, in association with Palmatolepis triangularis. This last one is recovered alone in a small interval and may therefor suggest the identification of the Lower triangularis-Zone.

A few Palmatolepis tenuipunctata, further than 42m, indicate the Upper triangularis- Zone.

* *
*

HOUYET 6

P. SARTENAER, 1970 (his point Houyet 53, section Pl. 1)

The whole section runs from the Upper gigas to the crepida-zone.

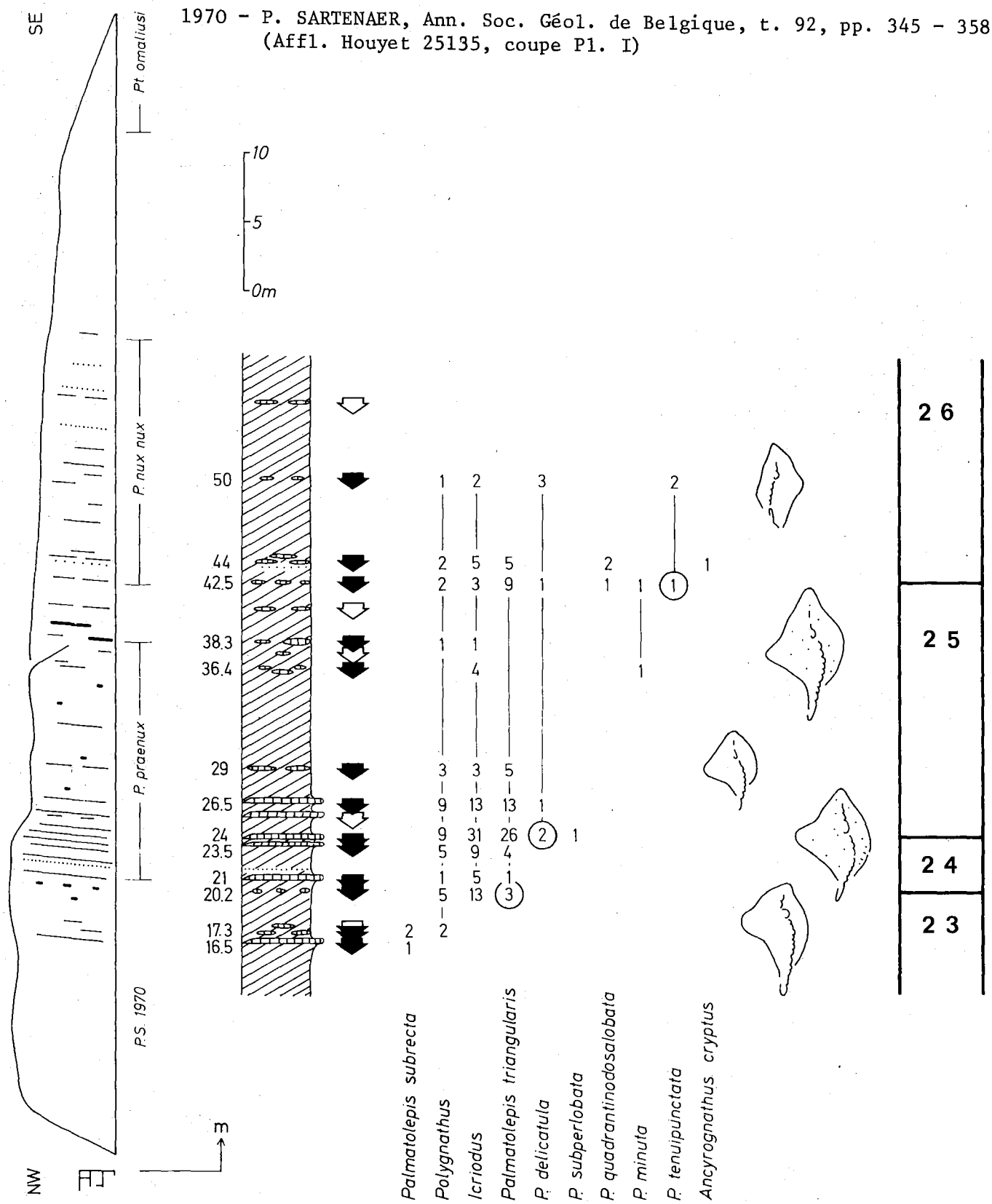
Only the transition between the Upper triangularis and the Lower crepida-Zone is studied here.

* *
*

Note : All microfaunas studied are Conodonts : from the gigas to the marginifera -Zone of W. ZIEGLER.
All figures are for samples of 1kg.

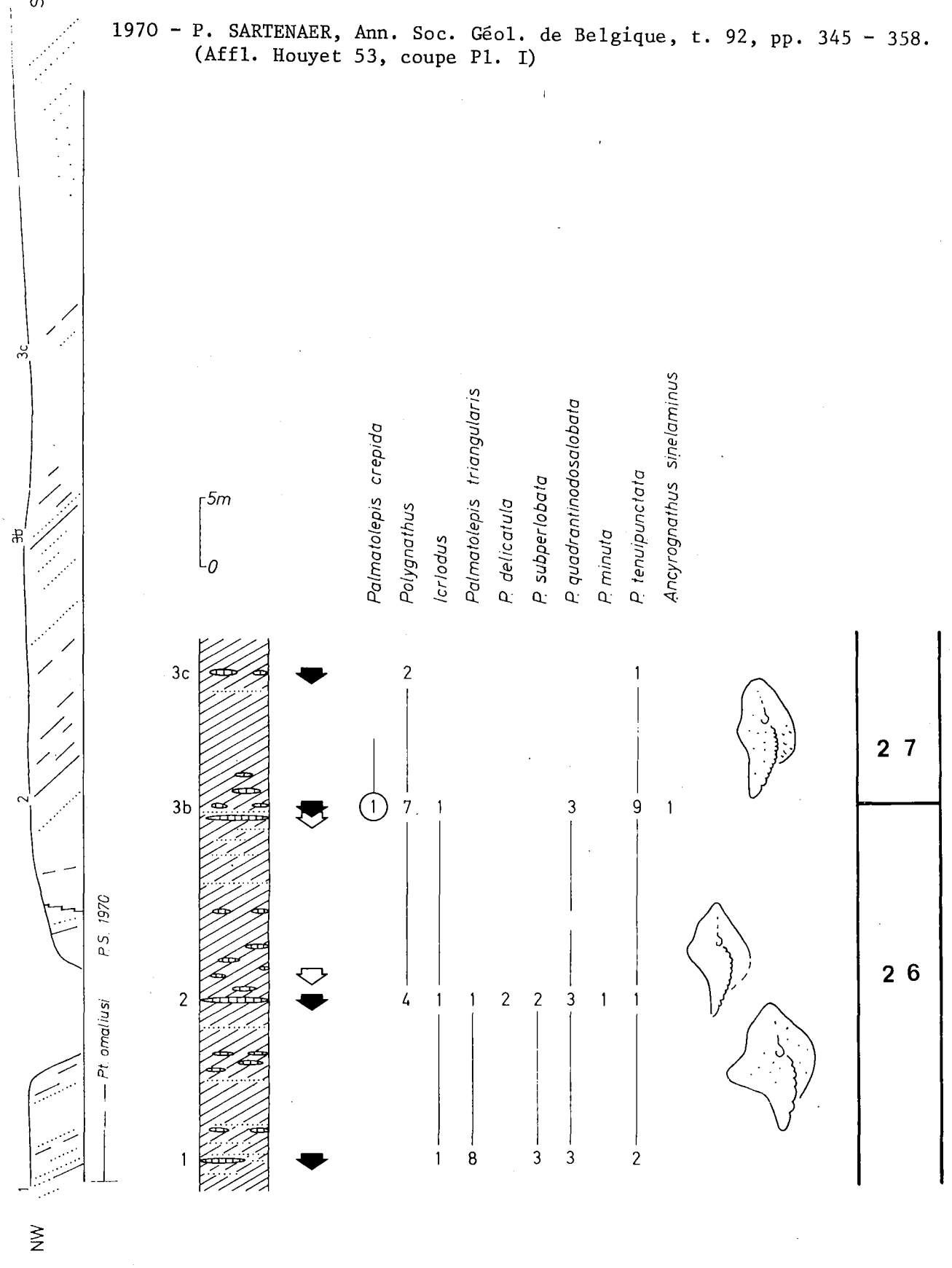
HOUYET 5 Mgm 23·26 I ①

1970 - P. SARTENAER, Ann. Soc. Géol. de Belgique, t. 92, pp. 345 - 358.
(Affl. Houyet 25135, coupe Pl. I)



HOUYET 6 Mgm 26·27 I (2)

1970 - P. SARTENAER, Ann. Soc. Géol. de Belgique, t. 92, pp. 345 - 358.
(Affl. Houyet 53, coupe Pl. I)



WIESMES (Beauraing 53)

This railway cut provides a good support to the Middle crepida- Upper crepida boundary, with the first occurrence of Palmatolepis glabra.

Higher, by lack of the name bearer, the rhomboidea-Zone has not been recovered, but a few specimens of Palmatolepis quadrantinodosa and Palmatolepis marginifera mark soon the marginifera-Zone, sensu SANDBERG and ZIEGLER (1973).

* *
*

SINSIN (Aye 46)

J. BOUCKAERT and W. ZIEGLER , 1965
P. SARTENAER, 1968 (his point Aye 57, section Pl. V)
M. COEN, 1973 (figured specimens, Fig. 5)

The section is in a synsline. J. BOUCKAERT and W. ZIEGLER (1965) worked in the southern limb. They recognized the Upper gigas and the triangularis-Zone, but couldn't precisely state if the lower part of this one were present.

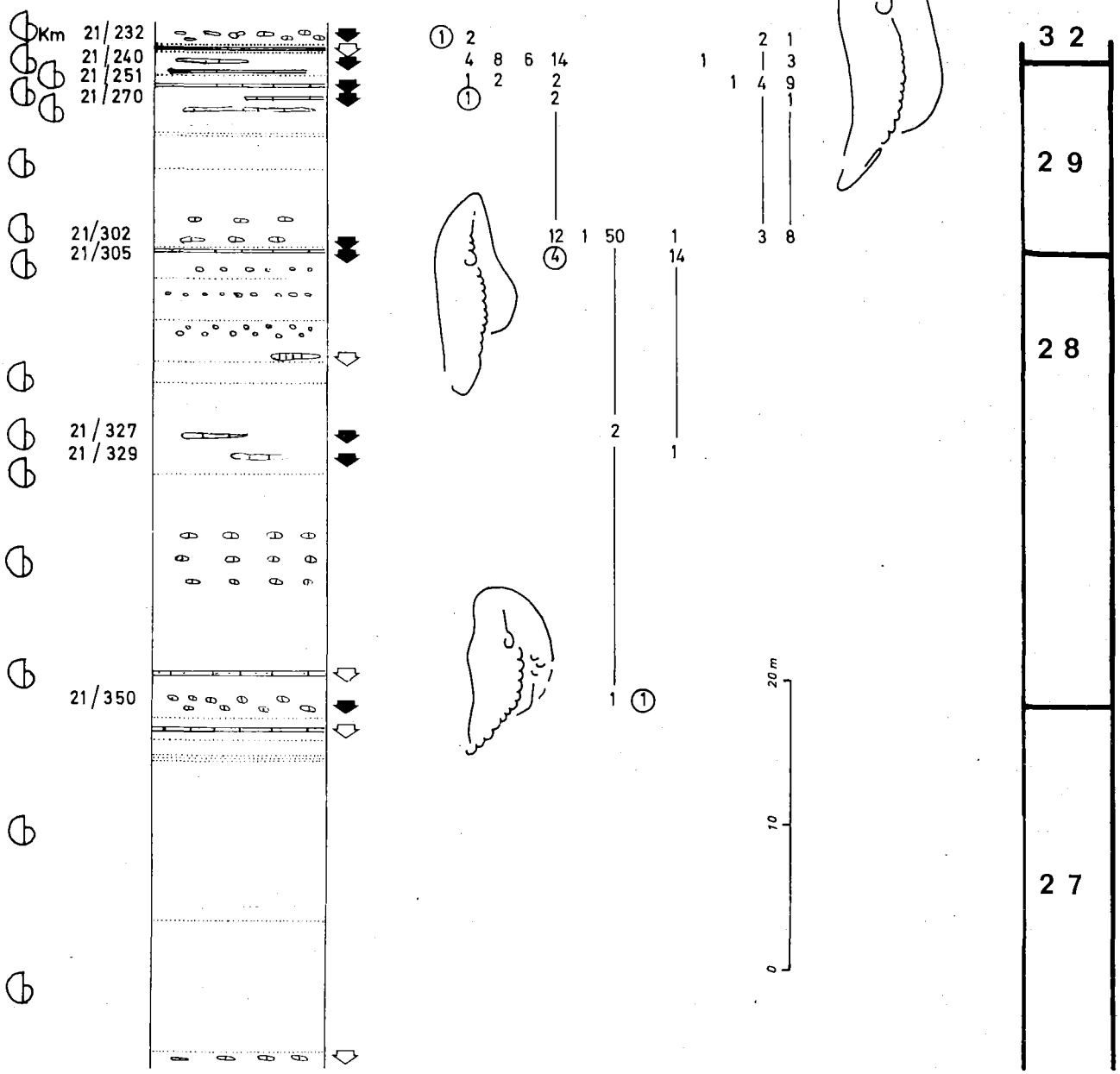
In the other limb - North of the bridge - a rather rich microfauna has been collected :

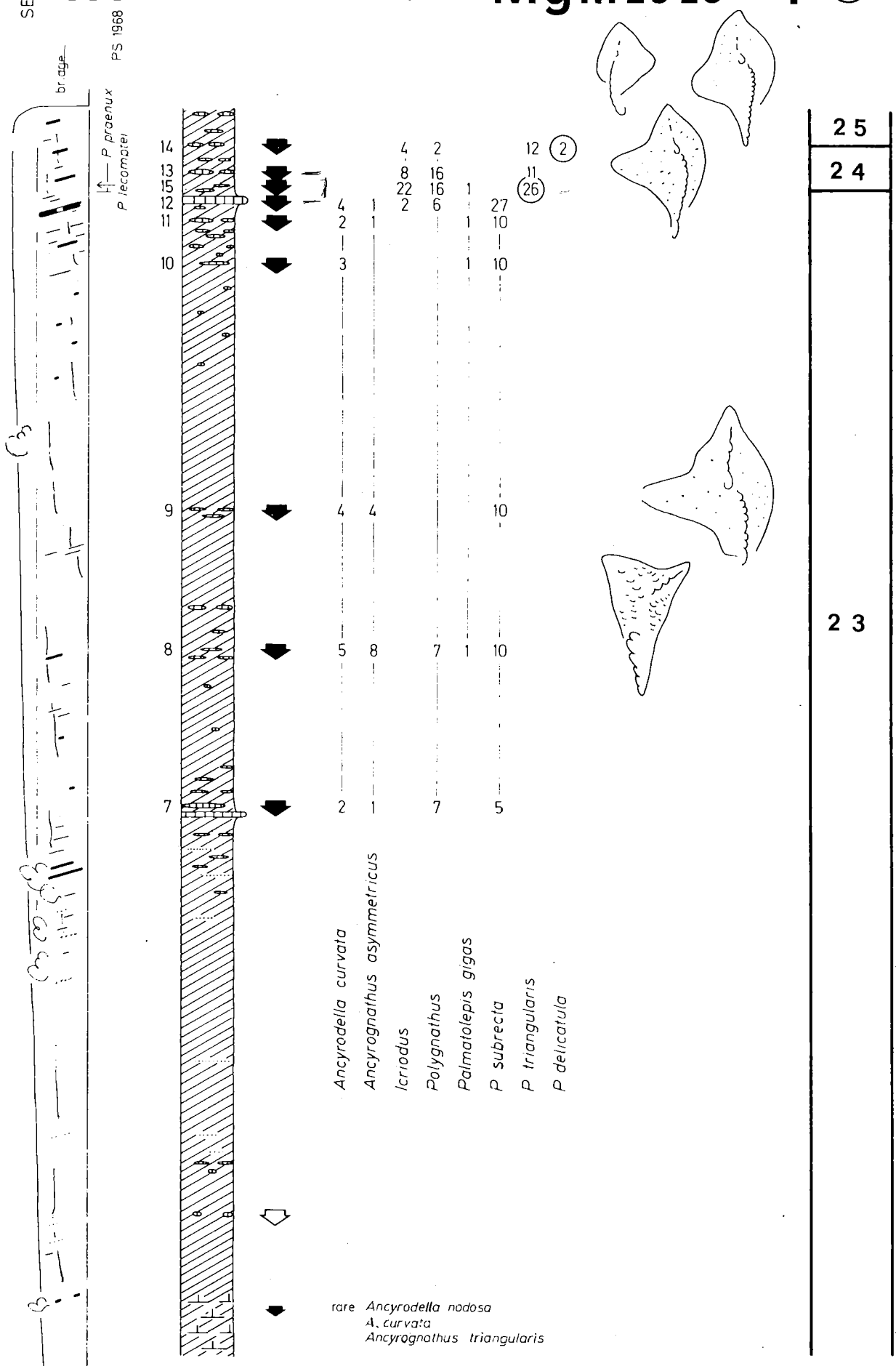
The Upper gigas-Zone is well characterized by Ancyrognathus asymmetricus, with a few specimens of the index fossil, numerous Ancyrodella curvata and Palmatolepis subrecta. Ancyrognathus becomes rare highwards ; A. curvata and P. subrecta disappear abruptly with the outburst of Palmatolepis triangularis.

Palmatolepis delicatula comes about 2m higher.

* *
*

BEAURAING 53 Mgm 27·32 I③





1968 - P. SARTENAER, Bull. Inst. r. sc. nat. de Belgique, t. 44 (Affl. Aye 57, coupe Pl. V).
1973 - M. COEN, Ann. Soc. Géol. de Belgique, t. 95, (Fig. 5).

NOISEUX

A very good section which yielded rich Conodont microfaunas from the Upper gigas to the Middle crepida-Zone.

Still, the Lower triangularis-Zone has not been recovered : Palmatolepis triangularis and P. delicatula appear together at layer 6, barely half a meter shales above the preceeding sample.

Otherwize is ZIEGLER's zonation classicaly recognized.

* *
*

HONY

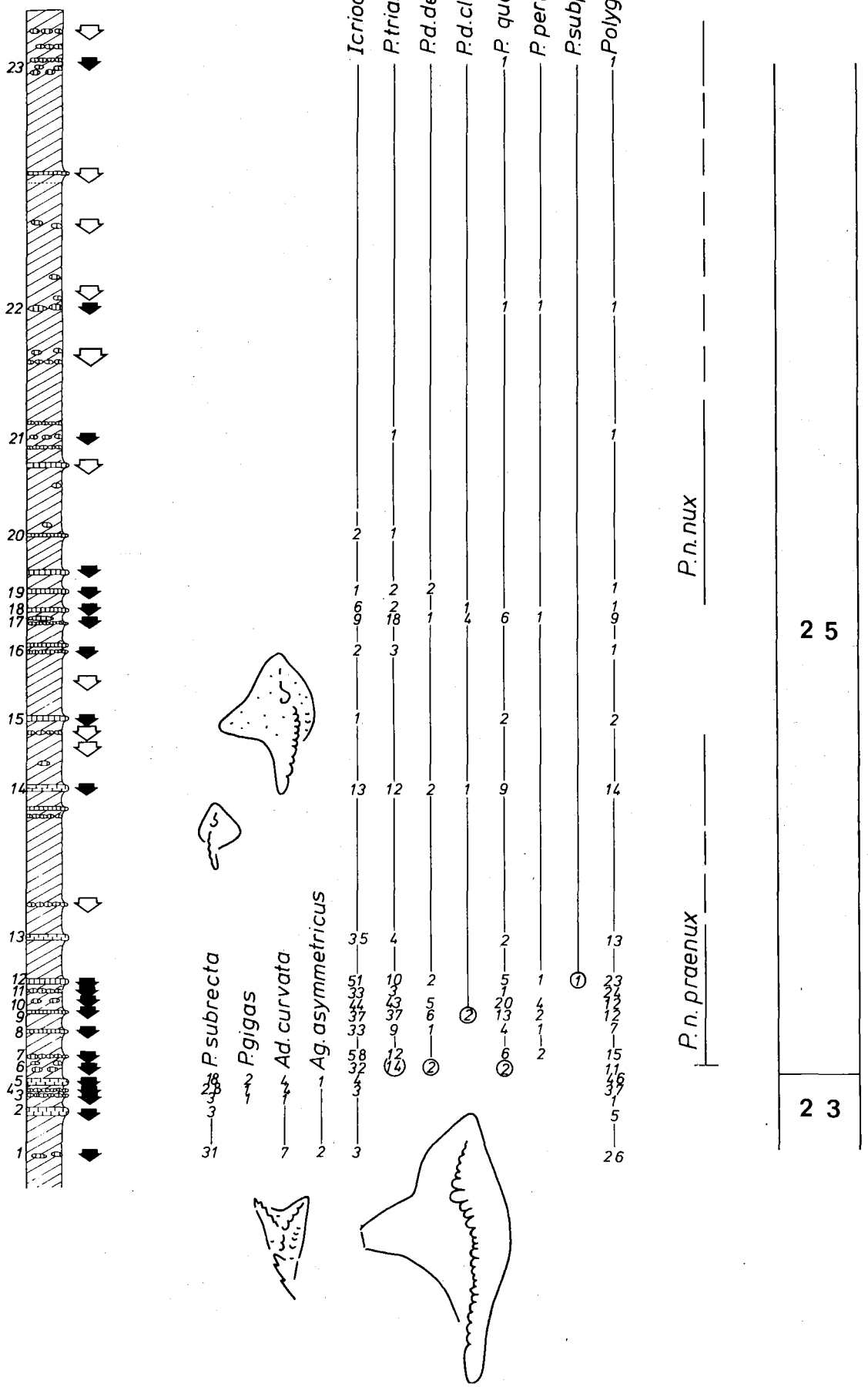
J. BOUCKAERT & J. THOREZ , 1965
J. BOUCKAERT A. N. MOURAVIEFF, M. STREEL, J. THOREZ and W. ZIEGLER, 1972

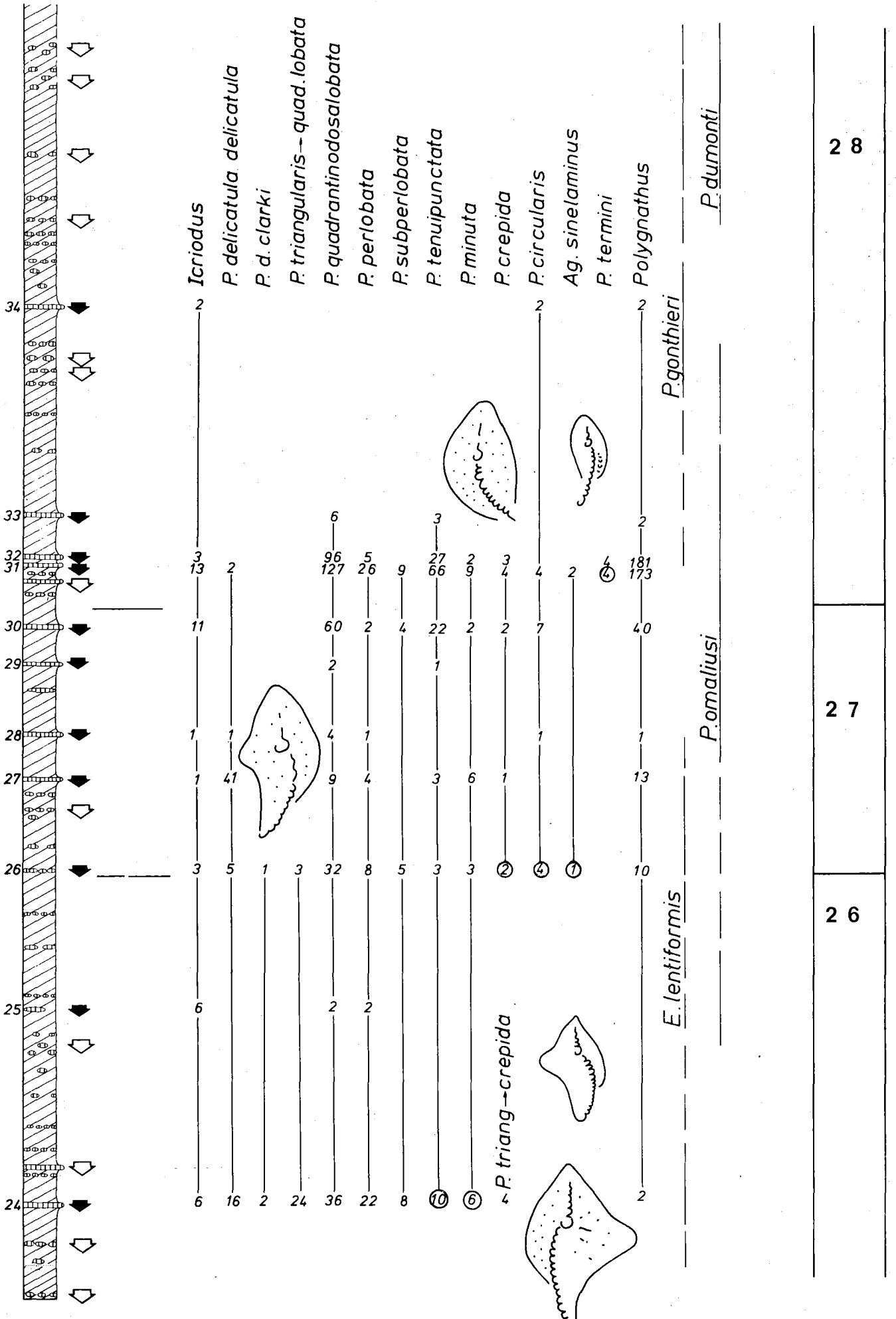
The gigas-triangularis boundary was discussed extensively by BOUCKAERT et al. (*). Palmatolepis delicatula had not been found and the Middle triangularis-Zone assumed only by the occurrence of Ancyrognathus cryptus.

Beyond the fault (sheet B) the lower boundary and the three subdivisions of the crepida-Zone are quite obvious.

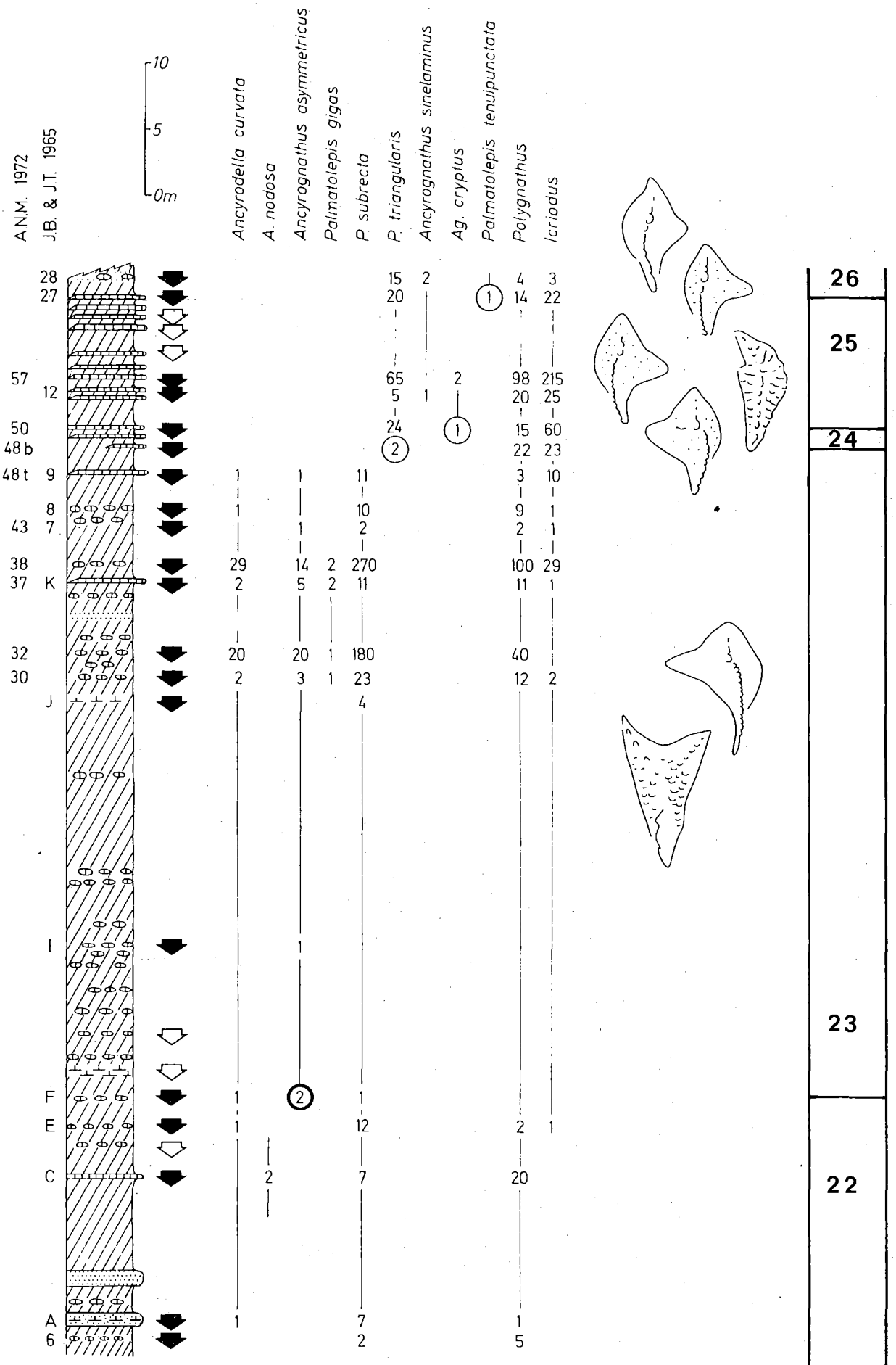
(*) At the end of the page 88 and page 90 above, read : the presence of Palmatolepis triangularis WITHOUT Ancyrognathus cryptus NOR Ancyrognathus asymmetricus allows us ...

NOISEUX Mgm23·25 I ⑤ a



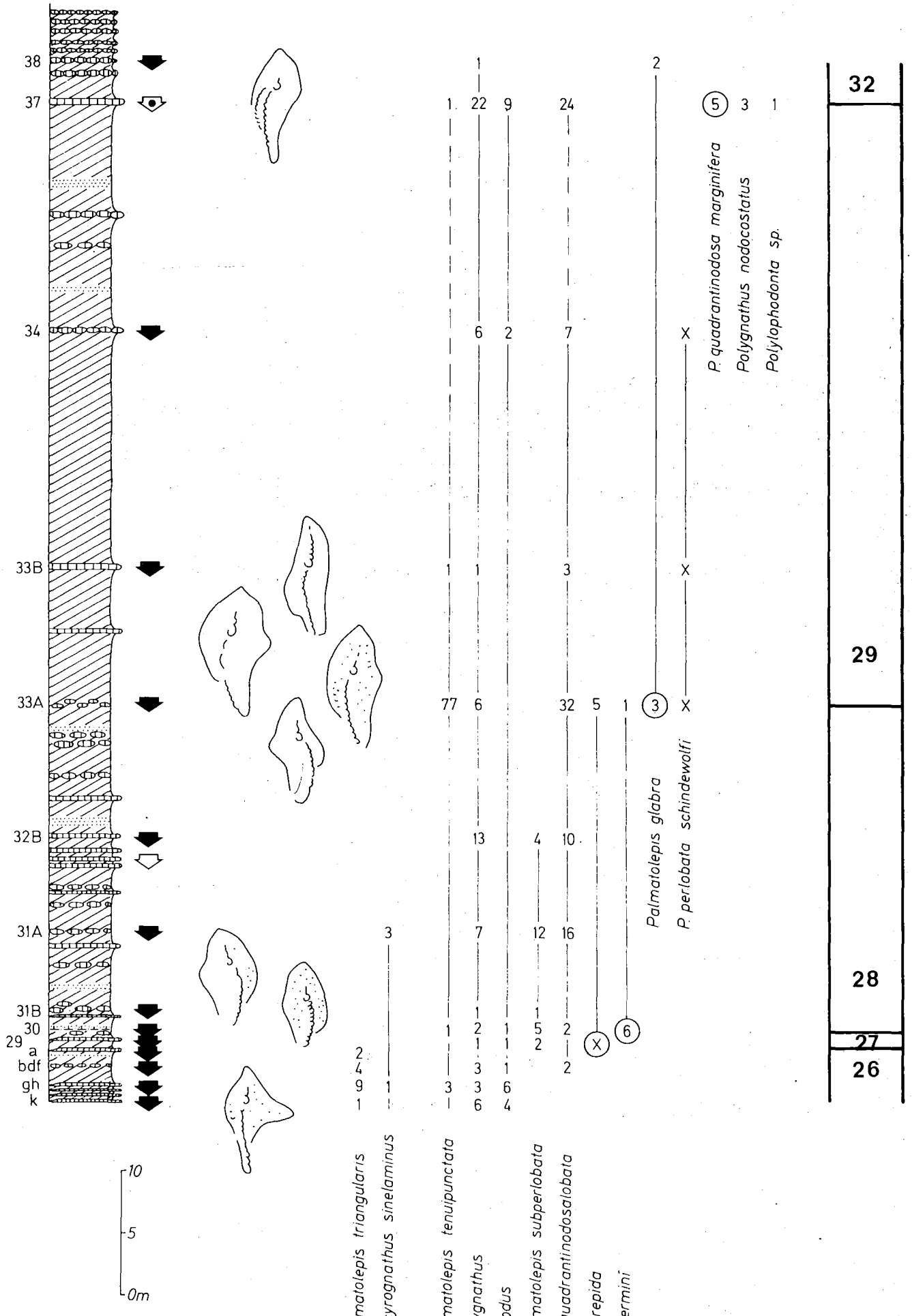

Icriodus
P. delicatula delicatula
P. d. clarki
P. triangularis – quad. lobata
P. quadrantinodosalobata
P. perlobata
P. subperlobata
P. tenuipunctata
P. minuta
P. crepida
P. circularis
Ag. sinelaminus
P. termini
Polygnathus
P. gonthieri
P. dumonti
P. omaliusi
E. lentiformis
P. triang – crepida
34
33
32
31
30
29
28
27
26
25
24
2 8
2 7
2 6

HONY I 6 a Mg m 22·32



1966 - J. BOUCKAERT et J. THOREZ, Bull. Soc. belge de Géologie, t. 74, pp. 1 - 7.

1972 - J. BOUCKAERT, A. MOURAVIEFF, M. STREEL, J. THOREZ and W. ZIEGLER, Geologica et Paleontologica 6.


38
37
34
33B
33A
32B
31A
31B
30
29
a
bdf
gh
k
10
5
0m
Palmatolepis triangularis
Ancyrognathus sinelaminus
Palmatolepis tenuipunctata
Polygnathus
Icriodus
Palmatolepis subperlobata
P. quadrantinodosalobata
P. crepida
P. termini
Palmatolepis glabra
P. perlobata schindewolfi
P. quadrantinodosa marginifera
Polygnathus nodocostatus
Polylophodonta sp.
32
29
28
27
26

Palmatolepis rhomboïdea has not been collected, but P. marginifera, with Polygnathus nodocostatus and Polylophodonta sp. at layer 37, indicate a level as high as the marginigera-Zone. The association of this fauna with Palmatolepis tenuipunctata and P. quadrantinodosalobata - which ones shouldn't run over the crepida-Zone - would indicate a possible reworking in bed 37. Such phenomenas are frequent in the upper part of the Famennian in Belgium (see trip D).

* *
*

HAMOIR-XHIGNESSE

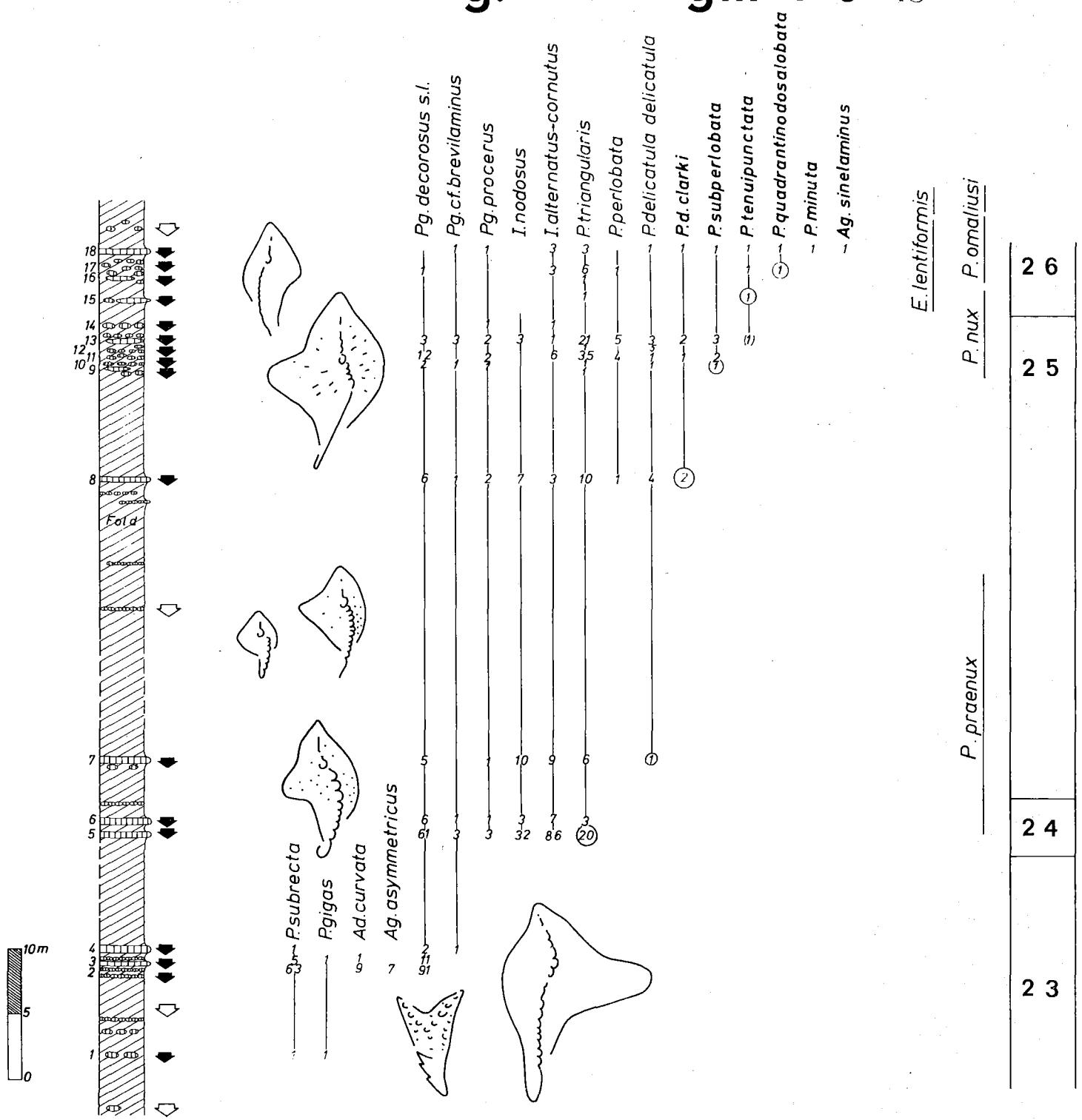
Simular to Houyet 5, this section extends from the Upper gigas to the Upper triangularis-Zone, but with a more representative fauna of the first Zone. Then can be observed, as usually :

- the outburst of Palmatolepis triangularis ;
- Palmatolepis delicatula a little higher ;
- at last the more discrete appearing of Palmatolepis tenuipunctata.

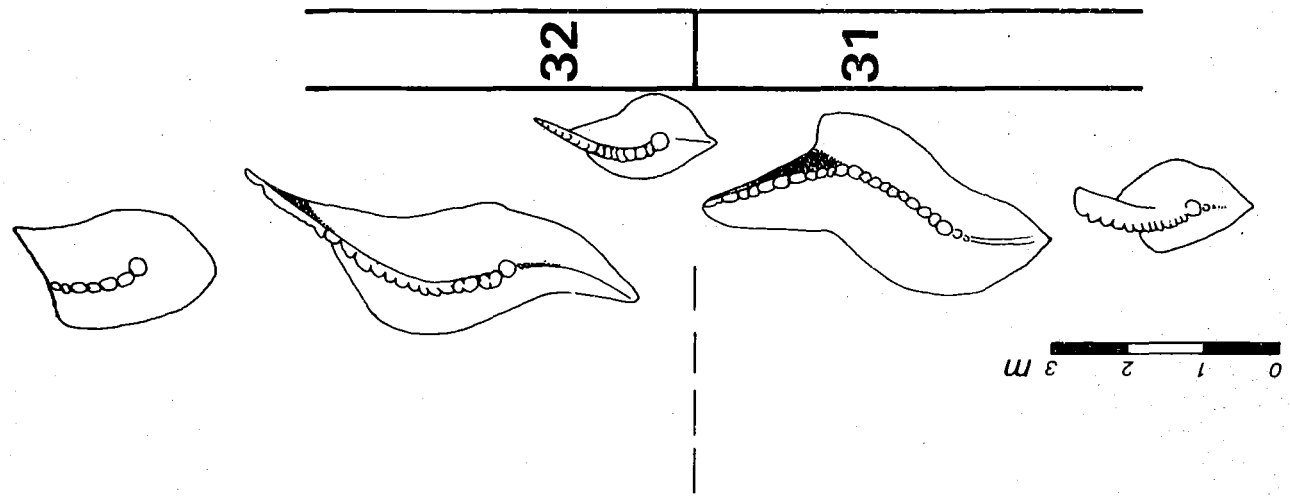
* *
*

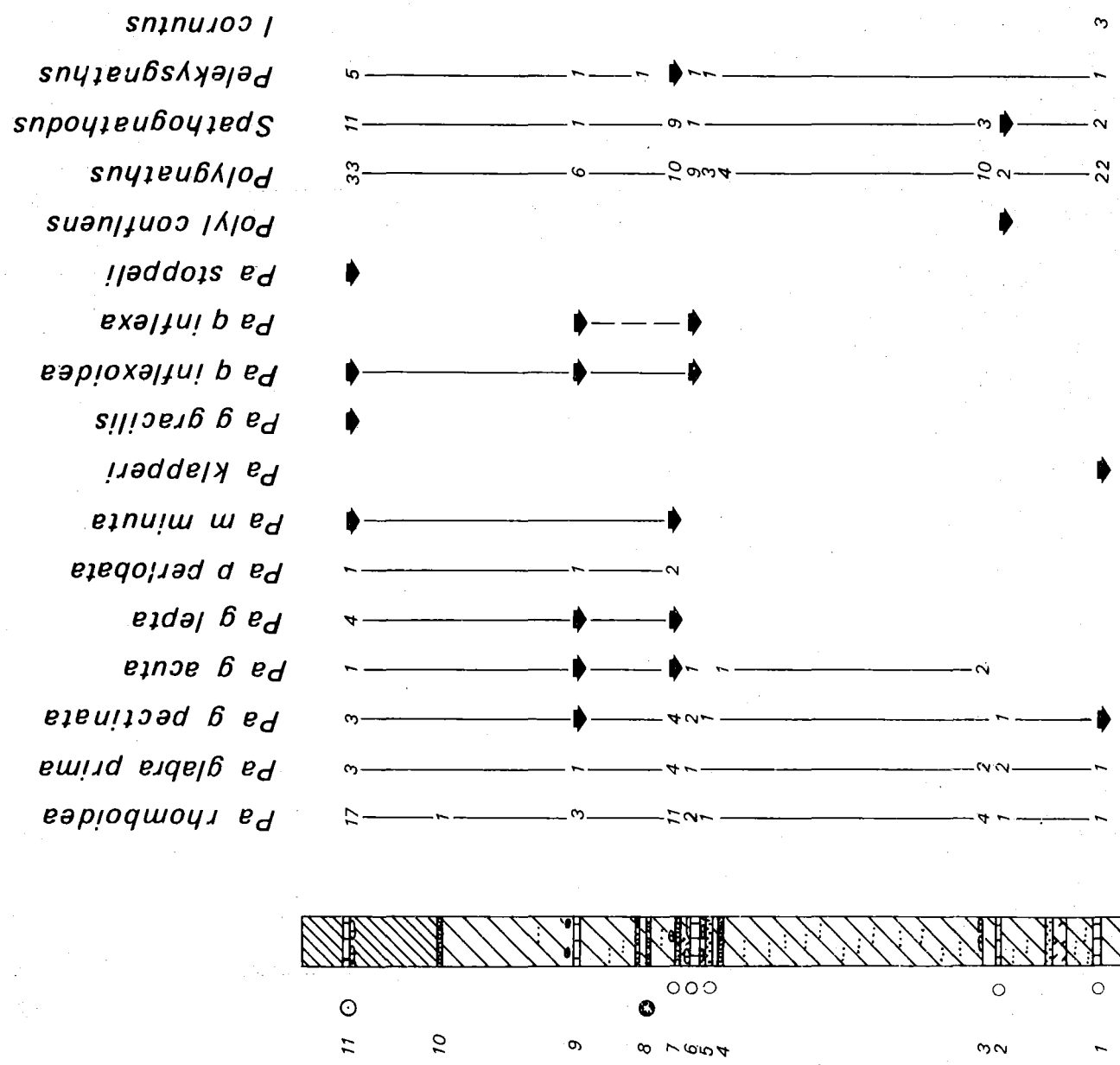
HAMOIR-NEBLON

This section is interesting by the occurrence of the Palmatolepis rhomboïdea fauna, which was lacking in other sections at corresponding level visited hitherto.


HAMOIR Xhig. Mgm 23-26 I⑦
Pg. decorosus s.l.
Pg. cf. brevilaminus
Pg. procerus
I. nodosus
I. alternatus-cornutus
P. triangularis
P. perlobata
P. delicatula delicatula
P. d. clarki
P. subperlobata
P. tenuipunctata
P. quadrantinodosalobata
P. minuta
Ag. sinelaminus
E. lentiformis
P. nux
P. omaliusi
P. praenux
P. subrecta
P. gigas
Ad. curvata
Ag. asymmetricus
Fold
10m
5
0
26
25
24
23

HAMOIR Neblon Mgm32•31 I (8)





The lower boundary and especially the transition between this rhomboïdea and the marginifera-Zone - as recently refined by SANDBERG and ZIEGLER - are supported by rich microfaunas.

* *
*

DURBUY (not visited)

M. COEN, 1973 (figured specimens Fig. 2)

This cut of the Ourthe river provides the rare opportunity of a continuous section throughout the Middle asymmetricus-Zone (to compare with data of trip F2).

It begins in fact in the Lower asymmetricus-Zone sensu ZIEGLER 1971, with the Ancyrodella rotundiloba fauna (see also trip E8). Some specimens which develop incipient secondary keels and carinas are reported to Ancyrodella sp. A M. SZULCZEWSKI 1971 (*)

The first occurrence of Ancyrodella gigas is assumed to indicate the Middle asymmetricus-Zone.

At layer 57 appear forms with an additional postero-lateral lobe which exhibits a more or less developed secondary keel on its lower surface (**).

(*) Such forms become numerically important highwards and are thought to occupy an evolutionary position between typical A. rotundiloba and A. gigas.

(**) Among last representatives of A. gigas (that is here about layer 7), posterior constriction may exhibit a slight disymmetry but without particular ornementation of such an incipient protrusion.

A
1
2
65
3
64
63
62
59
58
6
57
D
B
A
7
8
21
22
56
54
52
51
48
9
12
13
14
10
5
0m
Anc. / kg
Anc. rotundiloba binodosa
Anc. rotundiloba rotundiloba
Anc. rotundiloba alata
Anc. sp.A M.SZULCZEWSKI 1971
Ancyrodella gigas
Ancyrodella lobata
Ancyrodella curvata
Palmatolepis punctata
Palmatolepis transitans
Polygnathus asymmetricus
21
20
19

Specimens with complete additional secondary keel and at least a row of nodes for corresponding carina are attributed to Ancyrodella curvata ; the others to A. lobata. This group as a whole provides a good recognition of the Upper asymmetricus-Zone.

* *
*

BARVAUX (not visited)

M. COEN, 1973 (figured specimens Fig. 4)

A close sampling of the gigas-triangularis boundary shows :

- rare, but systematically occuring, Palmatolepis delicatula at layer 40 and above ;
- Palmatolepis triangularis found alone lower.

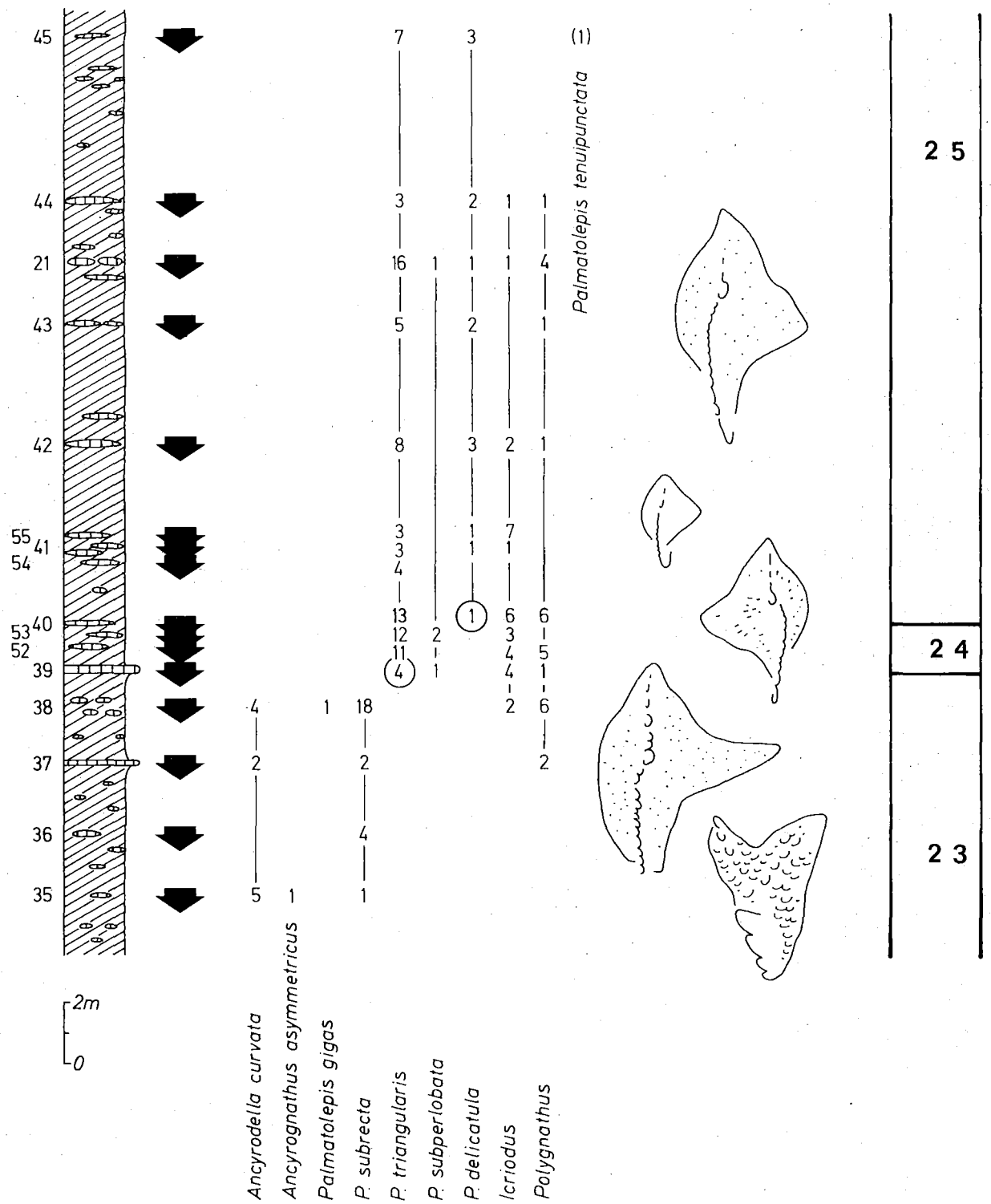
Once more the Lower triangularis-Zone seems to be well characterized, but of very small thickness.

Like at Sinsin, this triangularis-fauna succeeds quite sharply to this with Palmatolepis subrecta and other platform-conodonts of older affinities. Quantitative change is also observed in the Icriodus population.

* *
*

BARVAUX Mgm23·25 I ⑩

1973 - M. COEN, Ann. Soc. Géol. de Belgique, t. 95, pp. 239 - 253 (Fig. 4).



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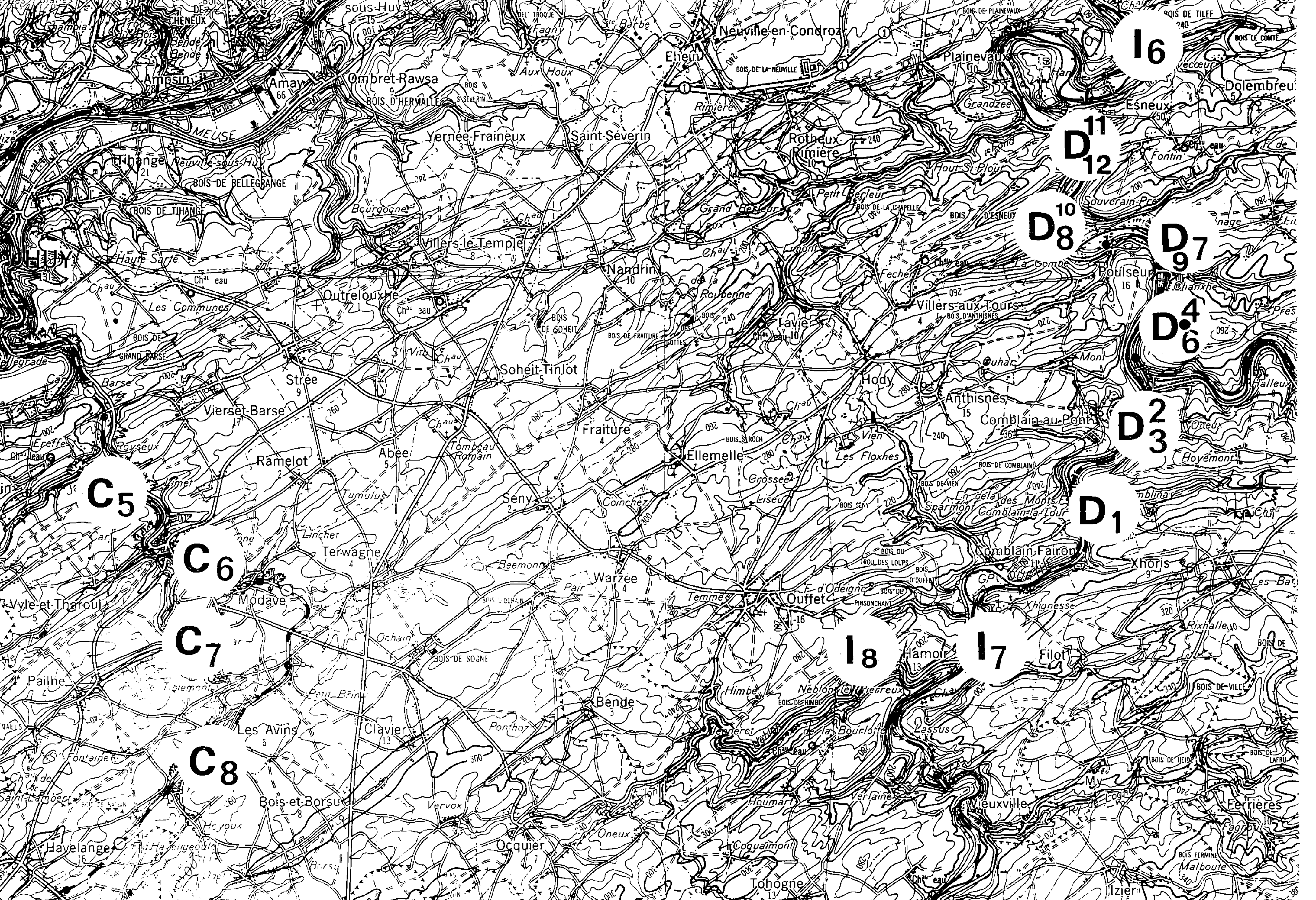
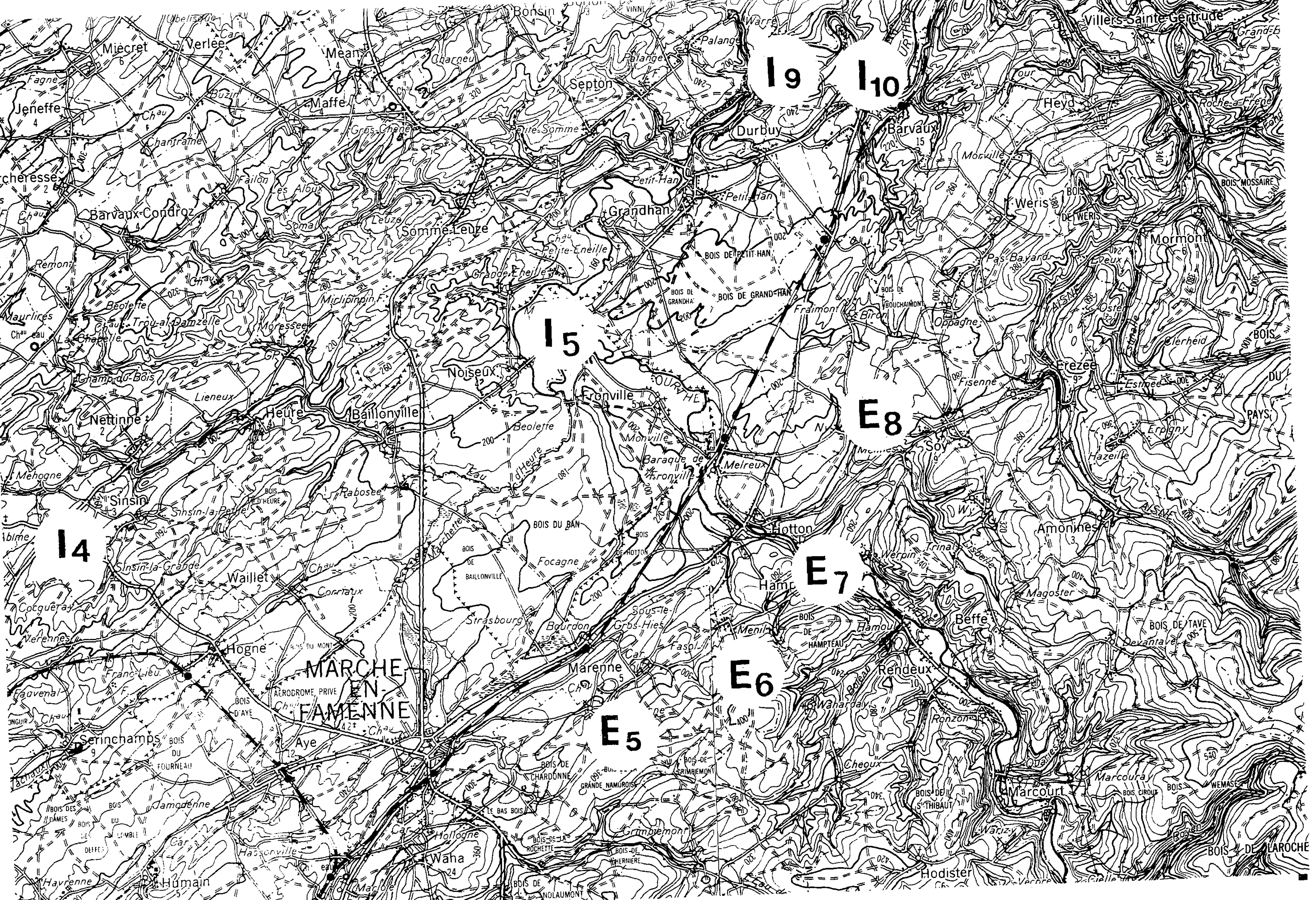
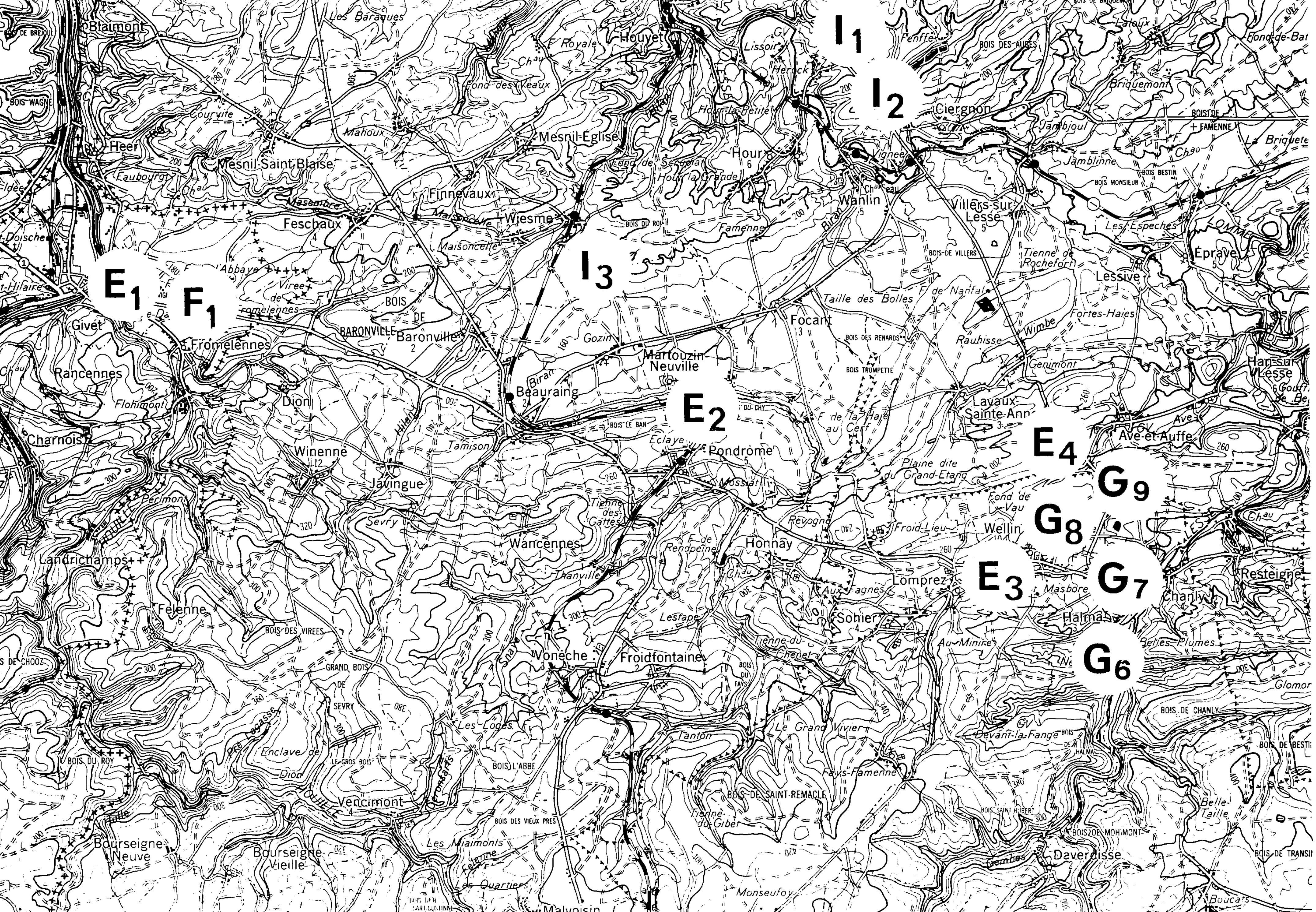

I6
D 11 12
D 10 8
D 7 9
D 4 6
D 2 3
D 1
I7
I8
C5
C6
C7
C8
HUY
Ampsin
Amay
Ombret-Rawsa
Neuville-en-Condroz
Ehein
Plainevaux
Esneux
Dolembreux
Yernée-Fraineux
Saint-Severin
Rotheux-Rimière
Tihange
Neuville-sous-Huy
BOIS DE BELLEGRANGE
BOIS DE TIHANGE
MEUSE
Villers-le-Temple
Nandrin
Outrelouxhe
Tavier
Villers-aux-Tours
Poulseur
Strée
Soheit-Tinlot
Hody
Anthisnes
Comblain-au-Pont
Vierset-Barse
Fraiture
Ellemelle
Ramelot
Abée
Tombeau Romain
Seny
Comblain-la-Tour
Comblain-Fairon
Xhoris
Terwagne
Modave
Warzée
Ouffet
Hamoir
Filot
Vyle-et-Tharoul
Pailhe
Les Avins
Clavier
Bende
Bois-et-Borsu
Havelange
Ocquier
Tohogne
Vieuxville
Ferrières
My
Izier


I9
I10
I5
I4
E8
E7
E6
E5
Miecret
Verlée
Mean
Septon
Durbuy
Barvaux
Villers-Sainte-Gertrude
Heyd
Jeneffe
Maffe
Barvaux-Condroz
Somme-Leuze
Grandhan
Petit-Han
Weris
BOIS DE WERIS
BOIS MOSSAIRE
Mormont
BOIS DE PETIT-HAN
BOIS DE GRAND-HAN
BOIS DE BOUCHAIMONT
Noiseux
Fronville
Nettinne
Heure
Baillonville
Erezée
Fisenne
Soy
Melreux
Hotton
Sinsin
BOIS DU BAN
Amonines
Waillet
Focagne
Hampteau
BOIS DE HAMPTEAU
Beffe
BOIS DE TAVE
Hogne
MARCHE-EN-FAMENNE
AERODROME PRIVE
Marenne
Rendeux
Serinchamps
BOIS DU FOURNEAU
Aye
BOIS DE CHARDONNE
GRANDE NAMUROISE
Marcourt
Waha
Hollogne
Hodister
Humain
BOIS DE LAROCHE



E1
F1
E2
E3
E4
G6
G7
G8
G9
I1
I2
I3
Givet
Blaimont
Heer
Mesnil-Saint-Blaise
Mesnil-Eglise
Houyet
Hour
Wanlin
Ciergnon
Villers-sur-Lesse
Lessive
Eprave
Han-sur-Lesse
Feschaux
Finnevaux
Wiesme
Fromelennes
Rancennes
Charnois
Dion
Baronville
Beauraing
Martouzin Neuville
Focant
Lavaux Sainte-Anne
Ave-et-Auffe
Pondrôme
Winenne
Javingue
Wancennes
Honnay
Wellin
Lomprez
Sohier
Halma
Chanly
Resteigne
Vonêche
Froidfontaine
Landrichamps
Felenne
Vencimont
Bourseigne Neuve
Bourseigne Vieille
Daverdisse

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INTERNATIONAL SYMPOSIUM ON

NAMUR 1974

BELGIAN MICROPALEONTOLOGICAL LIMITS

FROM EMSIAN TO VISEAN – SEPTEMBER 1st to 10th

EXCURSION J

Guide :

H. H. TSIEN

GUIDEBOOK

Edited by

J. BOUCKAERT & M. STREEL

Editors Notice

This paper, particularly on tab. 1, 2 and fig. 1, uses lithostratigraphical units, which for the most of them are presently submitted to the Belgian Commission on Stratigraphy and for which no official decision has so far been taken.
On the other hand, the chronostratigraphical units here proposed ought also to be sanctionned by the same Commission and later on by the I.U.G.S. Subcommission on Devonian Stratigraphy.
For these reasons the editors emphasize that those proposals must be considered only as under the author's responsability and that other proposals, not mentionned in this particular paper, have been submitted also to the Belgian Commission on Stratigraphy.

EXCURSION J : General Excursion in Devonian

Guide book

by H.H.TSIEN (x)

INTRODUCTION.

The two days field trip in the Devonian of Belgium may serve only as a short introduction to the geological history of the Dinant basin for the participents of the Symposium. The aspects of the aim of the excursion J are the following :

1. Facies changes and reef phenomena. The Belgium Devonian sediments offer an excellent opportunity to study the different sedimentary facies, the ancient reef phenomena and the paleoenvironments, in a relatively small and well developed sedimentary basin where the mud mound and the bioherm complexes developed in the relatively rapid subsiding basinal condition, the biostromes developed on the relatively stable shelf, the barrier reefs developed along the margin of the shelf and the dome frame reefs and the patch reefs developed behind the barrier edge, the open marin facies and the restricted facies are observed at the same time.

2. Paleontology and biostratigraphy. The Devonian of Belgium is very important to stratigraphers, because, it is one of the classic region of reference and the type areas of Couvinian, Givetian, Frasnian and Famennian are in the Dinant basin.

(x) Hsien Ho TSIEN, Univ. de Louvain, Labo. de Paléontologie, Place Louis Pasteur, 3, B-1348 LOUVAIN-la-NEUVE.- BELGIQUE.

The region is very interesting to paleontologists, because the Devonian sedimentary rocks of the Ardennes in Belgium are a highly fossiliferous complex of carbonates and shales world famous for its rich and varied fauna and it offers an excellent facies to study the biostratigraphy and the paleoecology of the conodonts (P.BULTYNCK, 1970, 1971, 1972, 1974 ; A.N.MOURAVIEFF, 1971, 1972, 1974).

The author would like to thank the help of their colleagues, especially that of Drs P.BULTYNCK, E.DRICOT, J.GODEFROID, D.LACROIX and A.N.MOURAVIEFF

STRATIGRAPHY.

The stratigraphic scheme proposed by E.MAILLIEUX (1929) will be refered only in the southern part of the Dinant basin, because the units of this scheme are defined indistinctly : sometimes, they are lithostratigraphic, sometimes biostratigraphic and their designation is chronostratigraphic in appearence. It is impossible to apply this scheme on the northern border of the Dinant basin. Therefore, the stratigraphic scheme proposed by H.H.TSIEN (1972, 1973, 1974), J.PEL (1974) and D.LACROIX (1974) will be used. The correlations of the different formations in the Dinant and Namur basins are shown in Tables 1 and 2. Stratigraphic relationships of the different facies are illustrated in figure 1. Local correlations have been established mainly by examination of the rich coral fauna and by conodont fauna in the open marine limestones facies. Conodont zones have provided the main basis in the southern border of the Dinant basin (P.BULTYNCK, 1970, 1971, 1972, 1974 ; A.N.MOURAVIEFF, 1971, 1972, 1974). A more detailed description on the conodont biostratigraphy is given in the excursions guide by P.BULTYNCK and A.N. MOURAVIEFF.

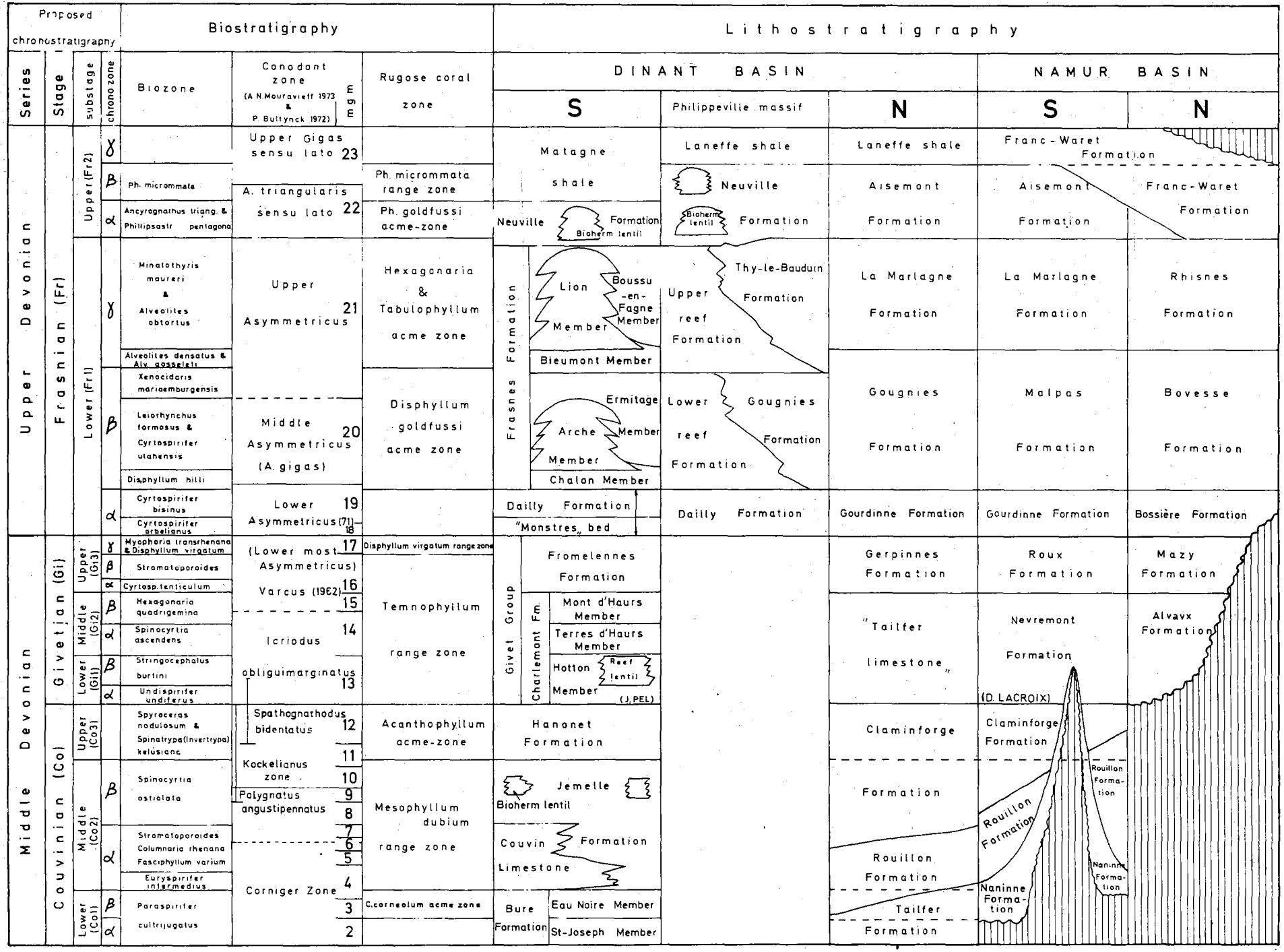
REGIONAL SETTING AND STRUCTURE

The Devonian of the Ardennes geosyncline was deposited with discordance on a Cambro-Silurian. Together with its Carboniferous cover it was deformed during the Hercynian orogeny. The major Hercynian tectonic units are, from south to north :

1. The Eodevonian synclinal basin of Neufchateau,
2. The anticlinal ridge of the Cambrian massifs of Rocroi and Serpont,
3. The synclinal basin of Dinant, mainly Devono-Carboniferous,
4. The synclinal basin of Vesdre which is the eastern extension of the Dinant basin on the northern flank of the Cambrian massif of Stavelot,
5. The faulted Silurian anticline of the Condroz,
6. The synclinal basin of Namur, mainly Devono-Carboniferous,
7. The anticlinal massif of Brabant, mainly covered by a post-Paleozoic blanket,
8. The Campine synclinal basin, entirely covered by a post-Paleozoic blanket.

Study of the five basins reveals the various stages of the Devonian transgression and the paleogeographic pattern of different period. The Devonian sea arrived at the northern flank of the Dinant basin in the Gedinnian, at the northern margin of the Namur basin in the Givetian, but did not reach the Campine basin until the Frasnian.

Excepting the longitudinal structural units, there exists also a series of transversal axes of the subsidence alternating with the zone of bulges on which the reef formations are better developed (fig.2).


Proposed chronostratigraphy
Biostratigraphy
Lithostratigraphy
Series
Stage
substage
chrono zone
Biozone
Conodont zone (A.N.Mouravieff 1973 & P. Buttynck 1972)
Rugose coral zone
DINANT BASIN
NAMUR BASIN
S
N
Philippeville massif
Upper Devonian
Frasnian (Fr)
Upper (Fr2)
Lower (Fr1)
Middle Devonian
Givetian (Gi)
Couvinian (Co)
Upper (Gi3)
Middle (Gi2)
Lower (Gi1)
Upper (Co3)
Middle (Co2)
Lower (Co1)
Upper Gigas sensu lato 23
Ph. micrommata range zone
A. triangularis sensu lato 22
Ph. goldfussi acme-zone
Upper Asymmetricus 21
Hexagonaria & Tabulophyllum acme zone
Middle Asymmetricus (A. gigas) 20
Disphyllum goldfussi acme zone
Lower Asymmetricus (7) 19
Disphyllum virgatum range zone
(Lower most Asymmetricus) 18
Varcus (1962) 17
Icriodus obliguimarginatus 16
Temnophyllum range zone
15
14
13
Spathognathodus bidentatus 12
Kockelianus zone 11
Polygnatus angustipennatus 10
9
8
Mesophyllum dubium range zone
7
6
5
Corniger Zone 4
C.corneolum acme zone 3
2
Ancyrognathus triang. & Phillipsastr. pentagona
Minatothyris maureri & Alveolites obtortus
Alveolites densatus & Alv. gosseleti
Xenocidaris mariaemburgensis
Leiorhynchus formosus & Cyrtospirifer utahensis
Disphyllum hilli
Cyrtospirifer bisinus
Cyrtospirifer arbelianus
Myophoria transrhenana & Disphyllum virgatum
Stromatoporoides
Cyrtosp. tenticulum
Hexagonaria quadrigemina
Spinocyrtia ascendens
Stringocephalus burtini
Undispirifer undiferus
Spyroceras nodulosum & Spinatrypa (Invertrypa) kelusiana
Spinocyrtia ostiolata
Stromatoporoides
Columnaria rhenana
Fasciphyllum varium
Eurypirifer intermedius
Paraspirifer cultrijugatus
Matagne shale
Neuville Formation
Bioherm lentil
Laneffe shale
Neuville Formation
Bioherm lentil
Frasnes Formation
Lion Member
Boussu-en-Fagne Member
Bieumont Member
Ermitage Member
Arche Member
Chalon Member
Upper reef Formation
Thy-le-Bauduin Formation
Lower reef Formation
Gougnies Formation
Dailly Formation
"Monstres" bed
Dailly Formation
Givet Group
Fromelennes Formation
Charlemont Fm
Mont d'Haurs Member
Terres d'Haurs Member
Hotton Member
Reef lentil
(J. PEL)
Hanonet Formation
Jemelle Bioherm lentil
Couvin Limestone Formation
Bure Formation
Eau Noire Member
St-Joseph Member
Laneffe shale
Aisemont Formation
La Marlagne Formation
Gougnies Formation
Gourdinne Formation
Gerpinnes Formation
"Tailfer limestone"
Claminforge
Formation
Rouillon Formation
Tailfer Formation
Franc-Waret Formation
Aisemont Formation
Franc-Waret Formation
La Marlagne Formation
Rhisnes Formation
Malpas Formation
Bovesse Formation
Gourdinne Formation
Bossière Formation
Roux Formation
Mazy Formation
Nevremont Formation
Alvaxx Formation
(D. LACROIX)
Claminforge Formation
Rouillon Formation
Rouillon Formation
Naninne Formation
Naninne Formation
Tailfer Formation

THIS PAPER				E. MAILLEUX (1929)	W. ZIEGLER (1971) & H. WITTEKINDT (1985)
UPPER DEVONIAN	Frasnian	Upper Frasnian (Fr 2)	γ	F3	Gigas Zone — Uppermost / Upper / Lower
			β		
			α	F2j	Triangularis Zone
		Lower Frasnian (Fr 1)	β	F2i, F2h	Upper asymmetricus Zone
				F2g	
			α	F2f, F2e, F2d	Middle asymmetricus Zone
				F2c	
			β	F2b	Lower asymmetricus Zone
			α	F2a	
MIDDLE DEVONIAN	Givetian	Upper Givetian (Gi 3)	γ	F1c	Lowermost asymmetricus Zone
			β	F1b	Hermanni-cristatus Zone
			α	F1a	Varcus Zone
		Middle Givetian (Gi 2)	β	Gi d	
			α	Gi c	Upper Obliquimarginatus
		Lower Givetian (Gi 1)	β	Gi b	
			α	Gi a	Lower Obliquimarginatus
	Couvinian	Upper Couvinian (Co 3)		Co2d	Kockelianus Zone
		Middle Couvinian (Co 2)	β	Co2c	
			α	Co2b	Bidentatus Zone
				Co2a	
		Lower Couvinian (Co 1)	β	Co1c	Corniger Zone (W. Ziegler)
				Co1b	
			α	Co1a	(H. Wittekindt)

Tab.2.- Relationships and different stratigraphic schemes used in the southern border of the Dinant basin.

*Correspond the period of non-deposition on the shelf in the north and in the stable region in the Rhenish Schiefergebirge.

Tab.1.- Outline of the Middle Devonian and Frasnian stratigraphy of Belgium.

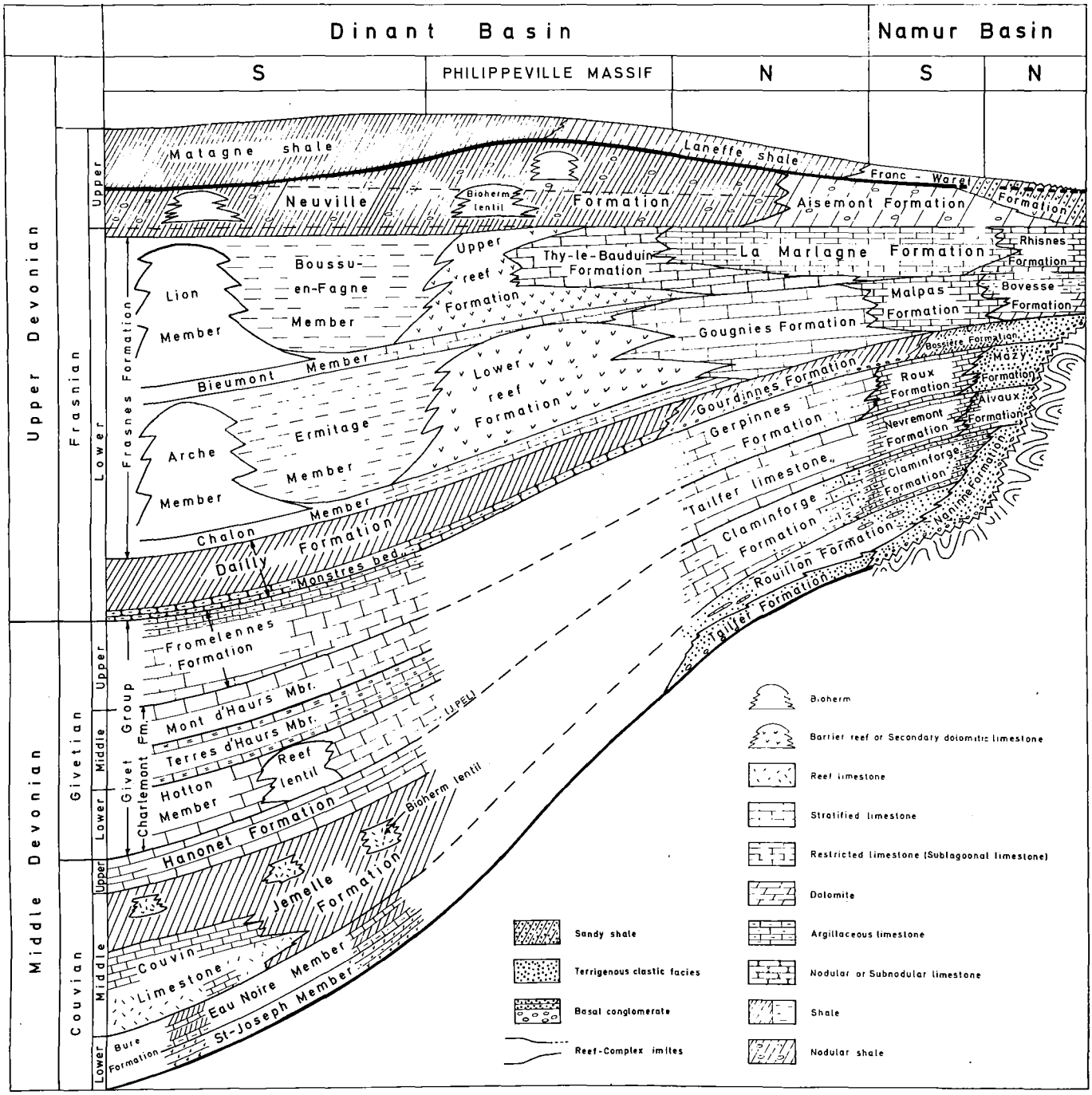


Fig.1.- Figure showing the relationships of the different sedimentary facies.

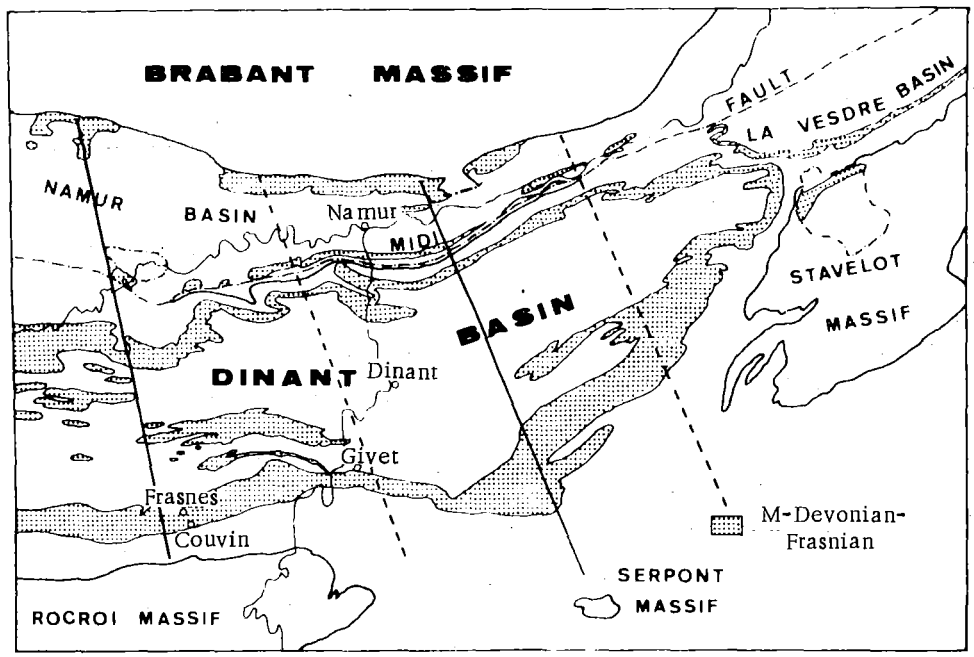


Fig.2.- Sketch map of southern Belgium showing the tectonic subdivisions of the Middle Devonian-Frasnian. Basin outlines drawn at the base of the Middle Devonian.

PALEOGEOGRAPHY AND SEDIMENTARY HISTORY.

Lower Devonian

The Lower Devonian is a pure terrigenous regime of which large quantities of terrestrial material came from the North Continent, the southern land (Franco-Alemannian island), and some islands within the basin (The Rocroi island in the southern part and the Stavelot island in the eastern part). The sedimentation of the Lower Devonian was very rapid, therefore, the terrigenous

sediments accumulated on the broad shelves are poorly sorted. And the sedimentation was so rapid that the environment was not suitable even for brachiopods. The quick sedimentation was balanced by the subsidence and was only at the end of Early Devonian time, the sedimentation lessened, and the sandy shally limestones with local horizons rich in shallow water benthos, mostly brachiopods, were found occasionally.

Couvinian.

The Lower Couvinian is a period of transitional phases between the pure terrigenous regime of the Lower Devonian and the calcareous regime of the Middle and Upper Devonian (Frasnian). In Middle Couvinian times the sea was bordered to the north by the shore of the Old Red Continent and to the south by a large Franco-Alemannian island. Between this island and continent, there existed two small islands, the Rocroi island in the southern part of the Dinant basin and the Stavelot island in the southern part of the Vesdre synclinorium (H.H.TSIEN, 1974). The Middle and Upper Couvinian beds in the Ardennes geosyncline become more and more sandy in the north and east directions. This facies distribution indicates clearly that the sediments came from the north (Old Red Contient) and east (Stavelot massif). The barrier reefs along Chimay-Couvin-Treignes region shows that the Rocroi island was a very low, almost featureless region where erosion was unimportant (Fig.3, fig.6A).

Givetian.

It was only at Middle Givetian time that the Rocroi and the Stavelot islands subsided with the rapid transgression of Gi2α

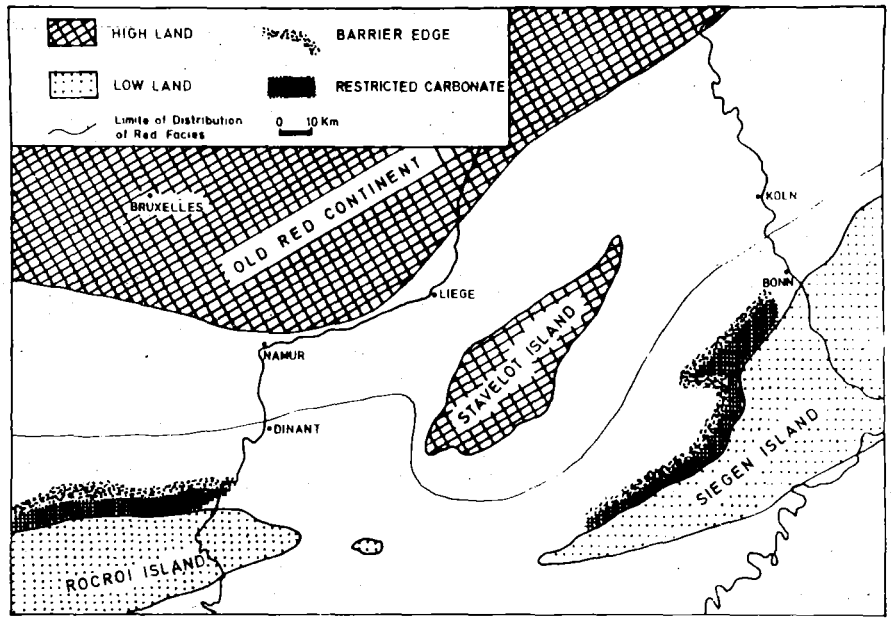


Fig.3.- Palaeogeographic map of southern Belgium during Couvinian time.

and disappeared definitively during early Middle Givetian time. This change of the paleogeographic pattern caused the development of the reefs and the sedimentary facies distribution in a manner totally different from those of the Couvinian. At this moment, the sedimentation from the north was not important, and the organic barrier reef was only formed along the south of the Chimay-Couvin-Givet-Rochefort. Between the barrier reef and the continent, a shelfward restricted marine environment was formed (Fig.6B). The Upper Givetian beds represent a regressive phase. The Gi3β time is a period of relatively stability during the regressive phase, in which resulted the re-establishment of reef conditions at the southern border of the Dinant basin. At this period, the restricted facies covered almost all Dinant and Namur basins.

Frasnian.

The paleogeographic pattern and the paleomorphology of the sea bottom of Early and Middle Frasnian times are quite different from those of the Middle Devonian (Fig.3). Consequently, the development of the reefs and the sedimentary facies distribution were in a manner totally different (Fig.4). At this time, the sea was bordered to the north by the shore of the Old Red Contient and to the south by the Franco-Alemannian island. There was non influence of the Rocroi and the Stavelot massifs. The Lower Lower Frasnian beds represent a transgressive phase while the reefs of Late Early Frasnian time were developed during a relatively stable phase. In Late Early Frasnian time, the rate of the subsidence on the southern border of the Dinant basin was different from on its northern flank. The southern area was a subsiding basin and the northern area was a relatively stable shelf. Bioherm complexes were developed in the rapid subsiding basin, the time-equivalent biostromes were developed on the relatively stable shelf and the barrier reefs were developed along the margin of the shelf (Fig.6C). The barren shales are entirely unrelated to the reef complex ; their deposition is posterior of the reef development. The ecological controls of the Upper Frasnian mud mounds different from those of the Lower Frasnian. The Upper Frasnian mud mounds were developed in a transgressive phase therefore, the red *Phillipsastrea* facies is time transgressive (H.H.TSIEN, 1971). During this phase, the sea floor subsided with the transgression and there was no relatively stable shelf on the north, except in the northwest part of the Vesdre synclinorium. Bioherms are developed in a relatively rapidly basin and biotromes are developed on a relatively stable shelf. Therefore there was no biostrome and barrier organic reefs in the Dinant basin during the period of Late Frasnian (Fig.5, Fig.6D).

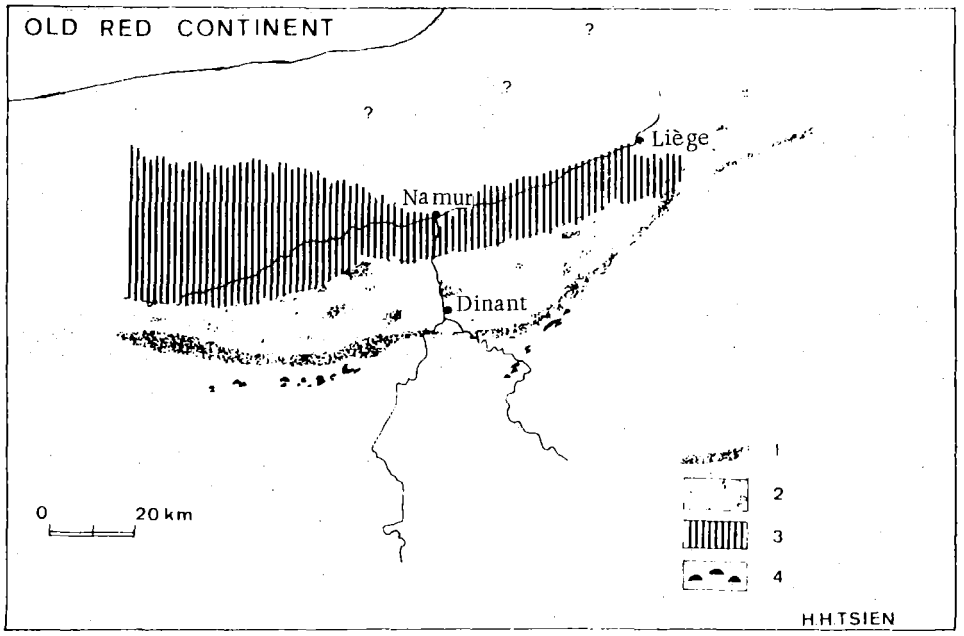


Fig.4.- Palaeogeographic pattern during Lower Frasnian time. 1. barrier reef ; 2. back-reef facies ; 3. restricted facies ; 4. open marine facies with bioherm complexes.

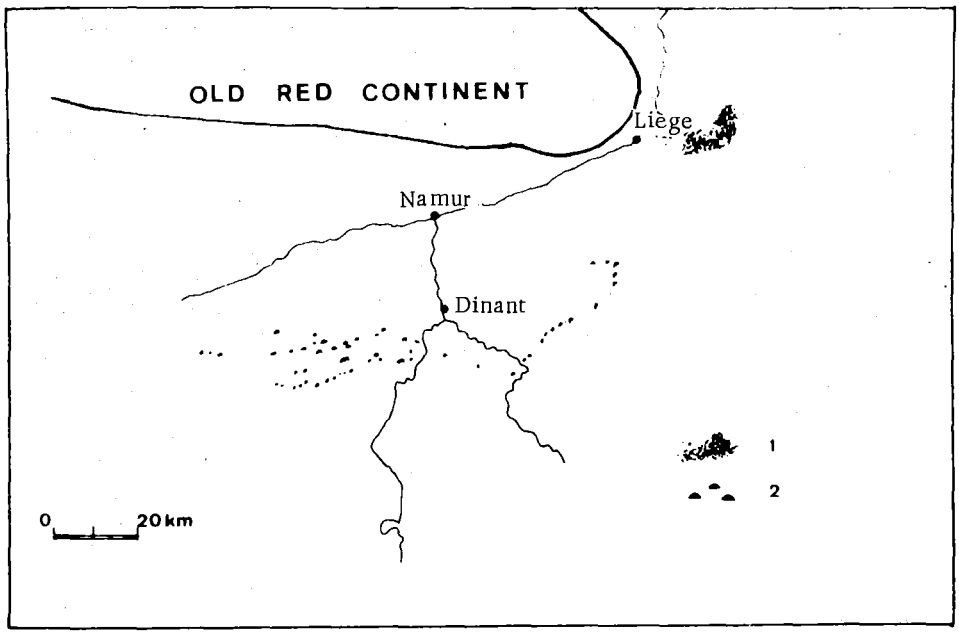
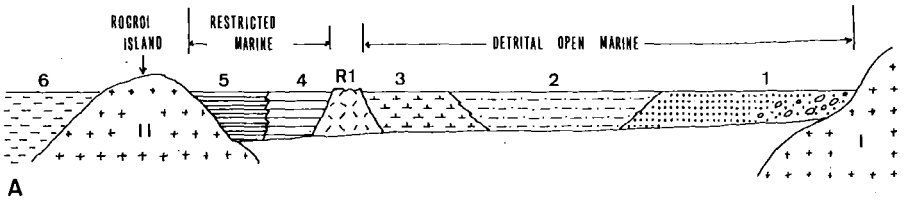
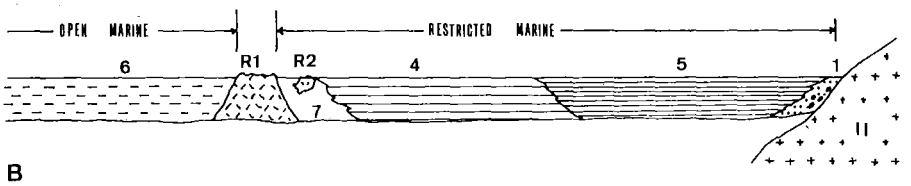


Fig.5.- Palaeogeographic pattern during Upper Frasnian time.
1. fringing reef ; 2. open marine facies with mud mounds.

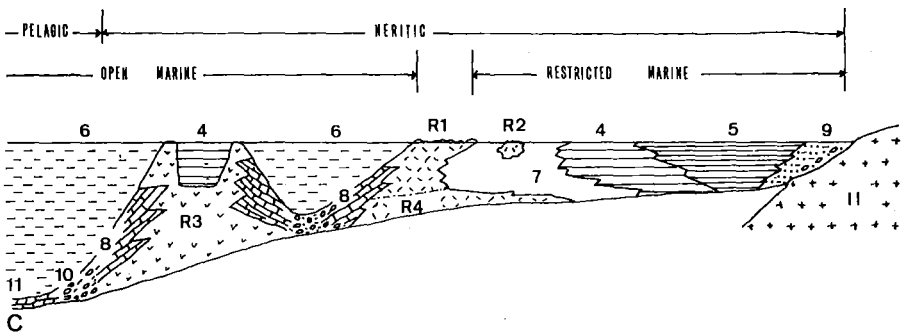
Fig.6.- Facies distribution pattern of different ages
A. Couvinian age, B. Middle Givetian age, C. Lower Frasnian age, D. Upper Devonian age. 1. littoral facies ; 2. terrigenous facies ; 3. open marine calcareous or shale facies ; 4. sublagoonal facies ; 5. lagoonal facies ; 6. open marine shales or barren shales ; 7. back-reef facies ; 8. slope deposits ; 8'. fore-reef facies ; 9. littoral facies during the stable phase (may present, but generally absent) ; 10. nodular shales ; 11. pelagic limestones ; 12. pelagic shales ; 51. barrier reef ; R2. patch reef ; R3. bioherm complex ; R4. biostrome ; R5. mud mounds; I. high land ; II. low land.


ROCROI ISLAND
RESTRICTED MARINE
DETRITAL OPEN MARINE
6
5
4
R1
3
2
1
II
I

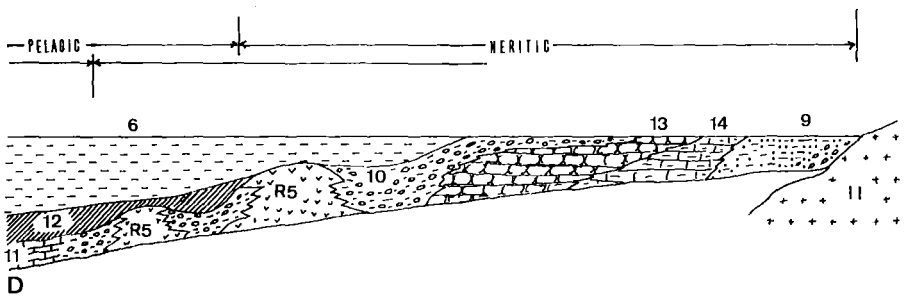
A


OPEN MARINE
RESTRICTED MARINE
6
R1
R2
4
5
1
7
II

B


PELAGIC
NERITIC
OPEN MARINE
RESTRICTED MARINE
6
4
6
R1
R2
4
5
9
7
8
R4
R3
8
11
10
II

C


PELAGIC
NERITIC
6
13
14
9
10
R5
12
R5
11
II

D

FACIES DISTRIBUTION AND REEF COMPLEXES.

Lithic-faunal associations

Several major lithic-faunal associations are recognized in the Devonian rock sequence of Belgium. The facies terminology used in this paper are defined by H.H.TSIEN (1974) and are summerized in Tables 3, 4 and 5 during the different phases. The facies variation and their distribution pattern are quite different in the different phases and in the different periods (Fig.6). All these facies may partially intergrade or overlap each other. Their distribution are mainly influenced and controlled by paleogeographic pattern and the reef development (H.H.TSIEN, 1974).

Types of the reefs

The study of the Middle and Upper Devonian (Frasnian) reef complex shows that the Devonian reef development of Belgium was mainly controlled by the paleogeographic pattern and the epirogenic movements. Six types of reefs can be distinguished in the Ardennes geosyncline. Since there are various ambiguity in the definition of the different reef types, a brief definition of different reef types follows.

Bioherm : Sub-hemispherical organic reef isolated in shales.

Type A Mud mound : Bioherm built in the muddier water condition and suffering or not wave action during the transgressive phase. Neuville Quarry.

Type B Bioherm complex : Bioherm developed in the clear water condition suffering or not wave action in a subsiding basinal environment. Lion Quarry at Frasnes.

Type C Dome frame reef : Isolated organic reef developed in a locally favorable locality on the shelf. Fondry des Chiens at Nismes.

Type D patch reef : small bioherm build-up on the shelf. Ste-Barbe Quarry at Couvin.

Biostrome : Sheet like or layered organic reef developed on the relatively stable shelf suffering or suffering slightly wave action. Eau Noire.

Barrier reef : Barrier edge built by organic reef along the shelf margin suffering wave action. Quarry at Villers le Gambon.

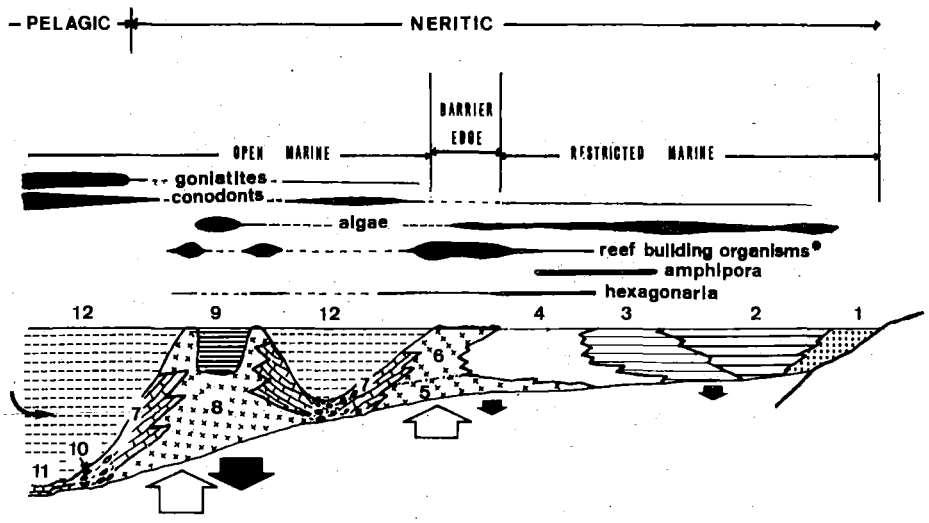


Fig.7.- Distribution of organisms in Lower Frasnian time. Black arrow : subsidence of sea floor ; white arrow : growth of reef ; curved arrow : lateral sedimentation, posterior of reef development ; length of the arrow corresponds to the rate.
1. Littoral facies ; 2. lagoonal facies ; 3. sublagoonal facies ; 4. back-reef facies ; 5. biostrome ; 6. barrier reef ; 7. slope deposits ; 8. bioherm complex ; 9. sublagoonal facies at the center part of the bioherm complex ; 10. open marine nodular shales ; 11. pelagic limestones ; 12. barren shales (posterior of the reef development).

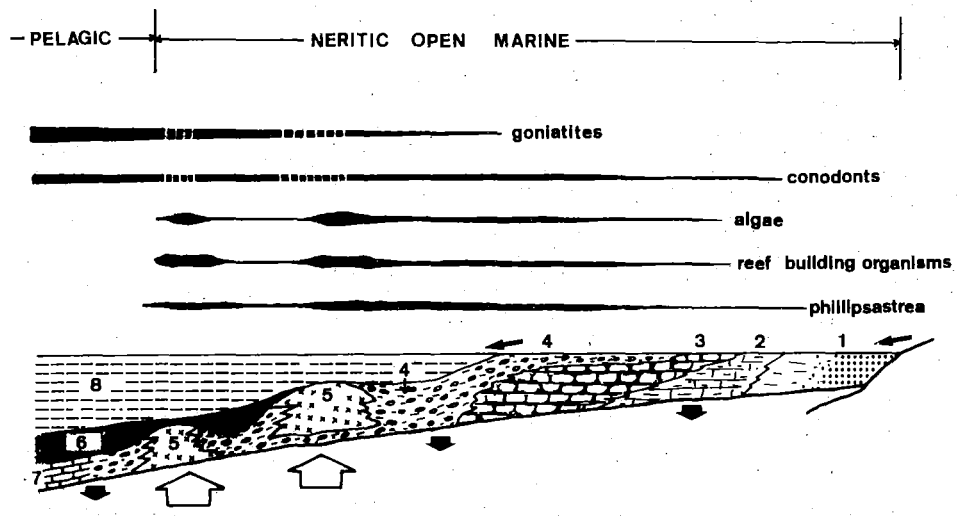


Fig.8.- Distribution of organisms in Upper Frasnian time. Black vertical arrow : subsidence of sea floor, horizontal arrow : lateral sedimentation, white arrow : growth of reef ; length of the arrow corresponds to the rate.

1. Littoral facies ; 2. open marine argillaceous limestones ; 3. open marine nodular limestones ; 4. open marine nodular shales ; 5. mud mounds ; 6. pelagic shales ; 7. pelagic limestones ; 8. open marine shales (posterior).

TABLE 3. The facies terminology in the relatively stable phase.

I. Open marine

A. Basinal condition :

1. Bioherm complex : a. Bioherm of turbulent zone : suffering wave action ; horizontal facies variation may present ; massive irregular stromatoporoids, massive tabulate corals, algae.

b. Bioherm of sub-turbulent zone : suffering slightly wave action ; large lamellar stromatoporoids.

c. Bioherms of under-turbulent zone : not suffering wave action ; crinoids or lamellar tabulate corals, algae and stromatactis.

2. Slope deposits : dark argillaceous limestones, conodonts.

3. Peri-reef facies : argillaceous limestones and/or nodular shales, corals and brachiopods.

4. Fore-reef facies : argillaceous limestones or breccia ; detrital corals and stromatoporoids.

5. Open marine limestones : argillaceous limestones ; massive corals, stromatoporoids, brachiopods and conodonts.

6. Off-reef beds in close relation with organic-rich carbonate masses : alternation of dark argillaceous limestones and calcareous shales ; solitary corals, thin lamellar tabulate corals, brachiopods and conodonts.

7. Pelagic limestones : dark fine limestones ; Buchiola, Goniatits and conodonts.

8. Pelagic shales : fine gray or dark shales ; Buchiola, Goniatits.

B. Shelf condition :

1. Widespread biostromes : generally developed in the earier stages.
   a. Biostrome of turbulent zone : suffering wave action, generally situated at outer margin of the "sheet like organic reef" ; massive globular stromatoporoïds.
   b. Biostrome of sub-turbulent zone : suffering slightly wave action large lamellar stromatoporoïds.
   c. Biostrome of under-turbulent zone : not suffering wave action ; generally developed in the first stage or at the inner part of the "sheet like organic reef" ; crinoids tabulate corals or *Hexagonaria, Disphyllum, Thamnopora* etc...
2. Dome frame reef or patch reef : only locally present.
3. Bank (Mechanically accumulated bank) : limestone bodies result from the activities of organisms, wave transportation and sedimentation.

II. Organic barrier edge

   1. Barrier reef : generally developed in the later stages at the outer margin of the stable shelf ; generally dolomitized.

III. Restricted marine

   1. Back-reef facies : layered skeletal limestones with still reef character, situated shelf-ward from the barrier edge.
   2. Sublagoonal facies : dark argillaceous limestones ; tennis ball-like massive stromatoporoids, *Amphipora, Stachyodes,* small *Hexagonaria* with deep calyx, algae.
   3. Lagoonal facies : algae, evaporites, stromatolites.

IV. Littoral facies : clastic sediments, generally absent but may locally present.

TABLE 4. The facies terminology in the transgressive phase.

1. Littoral facies : generally widespread.
2. Open marine argillaceous or nodular limestones.
3. Open marine shales or nodular shales with or without mud mounds.
4. Pelagic shales.
5. Pelagic limestones.

TABLE 5. The facies terminology in the quick sedimentation phase.

1. Barren littoral facies.
2. Open marin barren shale facies.

Ecological significance of fossils in the reef complex.

In studying the geology of the Devonian in Belgium, it has been found that the precise rhythm of the Hercynian movement and the paleogeography which controlled the different facies developments are much better marked by the organisms than by the sediments. Some flexibilities of the different organisms in their adjustments to the different environments have already been discussed by H.H.TSIEN (1970, 1971, 1974). Stromatoporoids, corals, crinoids and algae played an important role in the formation of reefs in the Devonian sedimentary basin. In some cases, stromatoporoids and corals are most important frame builders. While, algae are subordinate to stromatoporoids and corals and lived in, relatively calm conditions in the restricated carbonate facies or in the reef facies where they were protected by stromatoporoids and corals or other organisms and rocks from agitation. In some other case, algae played a very important role in the formation of reefs by trapping the sediments to form mud mounds of Upper Frasnian type.

The distributions of most important organisms in the Devonian reef complex of Belgium are summerized in the Figures 7 and 8 in the different phases. Reef building organisms are mainly stromatoporoids, tabulate corals and rugose corals. They are put together in the Figures 7 and 8, because, the reefs grew in various environments with correspondingly different associations of reef building organisms (H.H.TSIEN, 1974).

FIELD TRIP STOPS

Couvin-Frasnes Region

The Emsian, Middle Devonian and the Frasnian of the southern border of the Dinant basin.

Stop 1 : Eau Noire section at the south of Couvin. G (1)

1960 M.LECOMPTE
1964 M.LECOMPTE
1969 H.H.TSIEN
1970 P.BULTYNCK

Along the Eau Noire section the following succession of Units from Middle Emsian until Middle Couvinian can be observed (Fig.9).

Winenne Formation.

The Winenne Formation is characterized by an alternation of sandstones subgreywackes, quartzites, sandy shales and shales, essentially red in colour and destitute in fossils, at the lower part ; and by an alternation of sandy shales and sandstones and occasionally argillaceous, fossiliferous limestones at the upper part.

Hierges Formation

The lower part of this Formation is characterized by sandy shales , shales, sandstones and sandy, argillaceous, fossiliferous limestones. The middle part is represented by shales and sandstones ; the fossiliferous sandy argillaceous limestones becomes more important. The upper part of this Formation is essentially represented by shales and the fossiliferous sandy argillaceous limestones. The abundance of the shallow water benthos, mostly brachiopods, some *Pleurodictyum* sp. and crinoids indicates a already lessened sedimentation at Late Early Devonian time.

Bure Formation, St-Joseph Member.

The St-Joseph Member of the Bure Formation is represented by an alternation of shales and sandy argillaceous fossiliferous limestones.

Lower Devonian-Middle Devonian Boundary has been generally considered as the lower limit of the Bure Formation in the Couvin area. The first occurrence of *Alatiformia alatiformis, Euryspirifer mosellanus, Glossinulus mimicus,* and *Icriodus corniger* marks the lower boundary of the Lower Member of the Bure Formation.

The Middle Devonian is subdivided into a Lower Middle Devonian-Couvinian and an Upper Middle Devonian-Givetian. The lower boundary of the Middle Devonian coincide with Corniger Zone at the southern border of the Dinant basin. The reassignement of the Fromelennes Member to the Middle Devonian is assured by the occurrence of the coral fauna : *Stringophyllum acanthicum, Temnophyllum* and *Disphyllum virgatum.*

The lower part of the St-Joseph Member of the Bure Formation does not outcrop in the Eau Noire section, a complet section of this Member is seen at St-Joseph, south of Nismes.

Bure Formation, Eau Noire Member.

The Eau Noire Member of the Bure Formation is characterized by an alternation of calcareous shales and argillaceous limestones with small-stemmed crinoids, bryozoans, brachiopods, solitary rugose corals and lamellar and massive tabulate corals.

The Bure Formation shows the transitional zone between the pure terrigenous region of the Lower Devonian and the calcareous regime of the Middle and Upper Devonian (Frasnian). The beds of the Eau Noire Member show that the accumulating sediments changed considerably and carbonates developed for the first time in the Devonian sequence of Belgium. The outcrops indicate that the sea bottom lay in the quiescent zone ; the environment was favorable to brachiopods, small-stemmed crinoids, small solitary rugose corals and tabulate corals. Generally, they are smaller and few in number in the shales of the lower part of the Eau Noire Member of the Bure Formation. The size and number increase where argillaceous limestone are more common in the upper part of the Member.

Couvin Limestone.

The Couvin Limestone is characterized by reef limestones in the lower part (Ste-Barbe Member) and lagoonal limestones Abîme Member) in the upper part.

The beds of this Formation show the transition from the deeper quiescent environment to the shallow agitated environment. This changement can be correlated with the first appearance of fasciculate rugose coral, *Disphyllum couviniense* Tsien. Conditions then quickly became shollow and agitated and the accumulating limy sediments became pure in most parts of the Couvin area, until ultimately a barrier organic reef edge was formed. During this time the sea bottom was relatively stable ; the sea was shallow and the water was generally clear and agitated at the beginning, and the environment was particularly favorable to the

development of the sheet-like biostrome. The relatively stable sea bottom condition restricted organic growth ; the sheet-like organic reef developed continuously upward only at the shelf margin to forme a barrier reef or in a locally favorable region behind the barrier reef to forme the patch reef. Between the barrier edge and the Rocroi island, the restricted carbonate facies was formed.

Stop 2 : Sainte-Barbe quarry, Couvin **J (2)**

1960, M.LECOMPTE
1964, M.LECOMPTE
1969, H.H.TSIEN
1970, P.BULTYNCK

Couvin limestone, Ste-Barbe Member, patch reef facies near the barrier reef edge.

The patch reef situated near the barrier reef is well exposed.

The reef limestones contain mainly massive and tabulate stromatoporoids, *Favosites saginatus* and *Heliolites* sp. with some rugose corals, *Stringophyllum implicatum*, *Acanthophyllum rohnense* and *Mesophyllum praelongum*, and crinoids. The main crinoidal part is dolomitized (fig.10).

Stop 3 : Trou de l'Abîme, Couvin **G (1) (4)**

1960, M.LECOMPTE
1964, M.LECOMPTE
1969, H.H.TSIEN
1970, P.BULTYNCK

Couvin Limestone, Abîme Member, lagoonal limestones and banks.

The Upper Member of the Couvin Limestone is characterized by an alternation of fine dark limestones, detrital stromatoporoids, rugose coral limestones and banks. In this quarry, slumping structure, fine gray limestone with vermiculate structure indicating a lagoonal to sublagoonal environment, small tennis ball-like massive indicating a sublagoonal environment and detrital fasciculate

rugose coral banks are well exposed (fig.11).

Stop 4 : Chemin de Boussu-en-Fagne, Couvin. G (1) (4)

1960, M.LECOMPTE
1969, H.H.TSIEN
1970, P.BULTYNCK

Jemelle Formation, shales.

Jemelle Formation (Upper Middle Couvinian) is characterized predominantly by shales in which bioherms are developed sporadically.

The great subsidence of late Middle Devonian time, interrupted the first reef phase of the Couvinian. During this period of subsidence, conditions on the bottom of the sea again became deeper and the terrigenous sediments accumulated thoughtout practically all of the Dinant basin. The subsidence lessened considerably toward the upper part of the Jemelle Formation, when calcareous beds with stromatoporoids and tabulate corals and sometimes even bioherms developed again locally.

Stop 5 : Haine quarry, Couvin (fig.12). G (4)

1960, M.LECOMPTE
1964, M.LECOMPTE
1969, H.H.TSIEN
1970, P.BULTYNCK

5a : In the Haine quarry, the Hanonet Formation (Upper Couvinian) is represented by shales and alternation of dark argillaceous limestones and dark calcareous shales of off reef facies at lower part ; limestones in which biostromes are developed sporadically at upper part.

5b : Givet Group, Charlemont Formation, Hotton Member.

Lower limit of the Givetian, in the Couvin region, is marked by the occurrence of *Undispirifer undiferus* and coïncide with the lower limit of obliguimarginatus zone. Upper boundary is marked by the first appearance of *Ancyrodella rotundiloba binodosa* (MOURAVIEFF 1970 ; TSIEN, 1972).

In this part, the following succession of units of Early Givetian can be observed :

1. Off reef facies : dark argillaceous limestones.
2. Fore reef facies : argillaceous limestones, coarse coral, stromatoporoids and brachiopods debris.
3. Reef bank : bioclastic limestones, accumulation of stromatoporoids, coral and *Stringocephalus burtini*.

Stop 6 : Fondry des Chiens, Nisme **G (5)**

Reef lentil, Charlemont Formation, Hotton Member.

In this stop an isolated organic dome reef developed in a locally favorable locality on the shelf, behind the barrier reef, is observed.

This dome reef is, from bottom to top, characterized by (fig.13) :

1. 30 m crinoidal limestones.
2. 20 m crinoidal limestones with lamellar stromatoporoids and massive stromatoporoids.
3. 60 m pure limestones with irregular massive stromatoporoids.

Ecologically, the reef probably originated in the clear calm water and the main part of the reef was developed in the clear agitated water.

Stop 7 : Abundant quarry NW of Olloy (fig.14). **J (7)**

Sublagoonal facies, Charlemont Formation, Hotton Member.

About 2 km to the East of Fondry des Chiens, in this abundant quarry, the reef facies is replaced by the dark gray argillaceous limestones of sublagoonal facies.

Three main types of sublagoonal carbonates occur in this abundant quarry :

1. The light gray and dark gray argillaceous limestones with *Amphipora* and *Stachyodes*.
2. The fine light gray limestones with "birdeseye" structure and algae.
3. The bioclastic limestones with *Thamnopora* debris and lamellar stromatoporoids.

Stop 8 : Vaucelle Quarry (fig.15). J(8)

1960, M.LECOMPTE
1964, M.LECOMPTE
1970, A.N.MOURAVIEFF

8a. Vaucelle quarry, Frasnes-les-Couvin
Givet Group, Fromelennes Formation.

In this quarry, the alternation of back reef facies and sublagoonal facies can be observed at the main quarry and the argillaceous limestone and shales can be observed at the right side of the quarry.

The back reef facies consists mainly bioclastic limestones with massive stromatoporoids and coral debris.

The sublagoonal facies consists mainly gray fine limestones.

In the argillaceous limestones, the presence of *Lyniopecten gilsoni* and ostracodes indidactes probably a calm, somewhat restricted environment.

The wide spreaded broken and reworked *Disphyllum virgatum* indicates probably an uniformed, agitated, plateforme condition.

Upper boundary of the Givetian at Couvin region is marked by the first appearance of *Ancyrodella rotundiloba binodosa* (MOURAVIEFF, 1970 ; TSIEN, 1972). For detailed description on the conodont biostratigraphy see MOURAVIEFF (in this volume).

8b. Arche quarry, Frasnes-les-Couvin

1960, M.LECOMPTE
1964, M.LECOMPTE
1970, A.N.MOURAVIEFF

At this stop, the following succession of units of Early Frasnian can be observed (fig.15).

1. Dailly Formation : open marine shales.

The lower part of the Dailly Formation does not outcrop in this section. The Middle Devonian and Upper Devonian is contacted by a fault. A complet section with the Middle Devonian/Upper Devonian boundary is seen at Dailly where the lower limite of the Frasnian is marked by the occurrence of *Ancyrodella rotundiloba binodosa* (Conodont communicated by A.N.MOURAVIEFF).

2. Chalon Member : Lower limestone Member of the Frasnes Formation : open marine nodular shales and limestones with *Alveolites* and *Disphyllum*.

Note the size of the lamellar *Alveolites* increase upward ; the substratum of the reef was formed by 5 m thick of *Disphyllum*.

3. Arche Member : Lower bioherm Member, " Arche reef".

a. The base of the Arche reef consists of a dark argillaceous limestone with *Disphyllum* colony ± 2 m thick.

b. The lower part of the Arche reef, about 32 m, consists of a pinck to reddish zoned limestone with an essentially coralline fauna and *stromatactis* This part of the bioherm is mud mound type. *Alveolites* associated with *stromatactis*, algae, *Thamnopora*, *Disphyllum*, *Macgeea*, Brachiopods and crinoids.

Note the lamellar *Alveolites* become irregular and very large in the upper part.

c. The middle part consists of a gray limestone containing brachiopods (*Gypidula*, *Atrypa*) associated with *Alveolites* and

lamellar stromatoporoids.

d. The upper part is characterized by massive stromatoporoids associated with brachiopods (*Gypidula, Atrypa)* in local concentration.

Ecologically, the Arche reef represents the superposition of four environments :

i. Development of *Disphyllum* colony.

ii. Mud mound phase. Lamellar *Alveolites* and algae indicate and under-turbulent condition, not suffering wave action. The reddish colour and the argillaceous material indicate that the basin was still in the transgressive phase.

iii. Lamellar stromatoporoids indicates sub-turbulent condition, suffering slightly wave action.

iv. Massive irregular stromatoporoids indicates turbulent condition, suffering wave action.

At the top of the Arche reef, a beautiful panorama of the Frasnes-les-Couvin region is given (fig.16).

Stop 9 : Lion Quarry, Frasnes-les-Couvin. **F (4)**

1960, M.LECOMPTE
1964, M.LECOMPTE
1970, A.N.MOURAVIEFF
1974, A.N.MOURAVIEFF

At this stop, the following units of Upper Frasnian Formation can be observed (fig.17.)

1. Lion Member : Upper bioherm Member of the Frasnes Formation, "Lion-reef".

The reefs of this livel rest on the argillaceous stratified limestones (open marine limestone). They are not entirely constructed by massive stromatoporoids as would generelly be assumed. The association of the organisms is different from place to place in the reef. Therefore, this reef is bioherm complex type.

The Lion quarry only shows a part of the reef. Limestones of this reef are rather pure. The stromatoporoids and corals are more important at outer part of the bioherm ; the algae and the birdeseyes structure contained sediments are dominent at the center part of the reef. This fact indicates that the "Lion reef" is probably an atoll.

2. Boussu-en-Fagne Member : Upper shale Member ; two types of facies can be observed in the entrance of the quarry.

a. Peri-reef facies : nodular shales with corals and brachiopods.

b. Open marine barren shale facies : these shales are deposited posterior of the reef development. The source materials are probably came from the south. Contrarily, on the north flank of the Dinant basin and in the Namur basin, locally, there existes a sedimentational gap corresponding the barren shale deposits (Tab.1). (TSIEN et al, 1973).

3. Neuville Formation : nodular shales ; *Phillipsastrea* is rare in the southern border of the Dinant basin, except near/ and in the mud mounds.

Neuville - Philippeville region

Carbonate facies on the shelf border

At early stage of the reef development, on the relatively stable shelf, the environment was particularly favorable to the development of the sheet like biostrome. The relatively stable sea bottom condition restricted organic growth ; the sheet like organic reef developed continuously upward only at the shelf edge or in a locally favorable region on the border of the shelf to form a barrier reef edge. This barrier edge is generally replaced by dolomite. Shelfward of this dolomitized barrier reef, the back reef facies and the restricted carbonate facies were formed.

Stop 10 : Dolomite quarry at Villers-le-Gambon (fig.18). J (10)

1964, M.LECOMPTE

The Upper reef Formation is generally dolomitized.

In this quarry, a part of the Upper reef Formation is well exposed. It is completely replaced by dolomite. Two types of dolomite can be observed :

a. Dark dolomite : medium grey to medium dark grey or dark brown in colour.
b. White dolomite : coarsely crystalline ; light yellow to light grey or white in colour.

In the dark dolomite, the intercrystalline carbonaceous materials are common. Non fossils, even fossil fragments have been found in the main part of the quarry ; except at the uppermost part of the Formation, *Hexagonaria*, *Tabulophyllum* and brachiopods have been found in the stratified bed.

Stop 11 : Section along the railway cut, Neuville. F (7)

1964, M.LECOMPTE
1964, E. van WINKEL
1970, J.BOUCKAERT and A.N.MOURAVIEFF

In this section, the following succession of units can be observed (fig.19).

1. Dailly Formation : open marine shales.
2. Gougnies Formation : dolomite at lower part, dark grey argillaceous limestones at upper part.
3. Thy-le-Bauduin Formation : alternation of back-reef facies and sublagoonal facies.

4. Neuville Formation : The sequence of this Formation, from bottom to top, consists :

a. Nodular shales with *Hexagonaria*, Fr 2β in age.

b. Nodular shales with *Phillipsastrea*, Fr 3α

c. Fine dark grey shale, Fr 3β

d. Nodular shales or/and argillaceous limestones with *Phillipsastrea* and massive *Iowaphyllum*, Fr 3γ

5. Matagne Shale : Fine dark shales, Fr 3γ

6. Famennian : shale and sandy shale.

For detailed description on the conodont biostratigraphy see A.N.MOURAVIEFF, in this volume.

The red coloured *Phillipsastrea* facies (Neuville Formation) is time-transgressive. Consequently, the poorly developed *Phillipsastrea* facies in the Frasnes region become more important in the Philippeville region.

Tailfer-Godinne region

The carbonate facies in the Tailfer-Godinne region represent mainly the back reef facies, sublagoonal facies, lagoonal facies and occasionally reef facies in the reef complex model of the Frasnian of Belgium (fig.7).

Stop 12 : Tailfer quarry, Tailfer J (12)

1960, M.LECOMPTE
1964, M.LECOMPTE
1964, E. van WINKEL
1973, H.H.TSIEN and al.

In this section, the following succession of units can be observed (fig.20).

1. Gourdinne Formation : organoclastic limestones with oligiste and shales.

2. Gougnies Formation : reef facies, back-reef facies and sublagoonal facies.

3. La Marlagne Formation : sublagoonal and lagoonal facies.

For detailed description see TSIEN and al (TSIEN and al, 1973).

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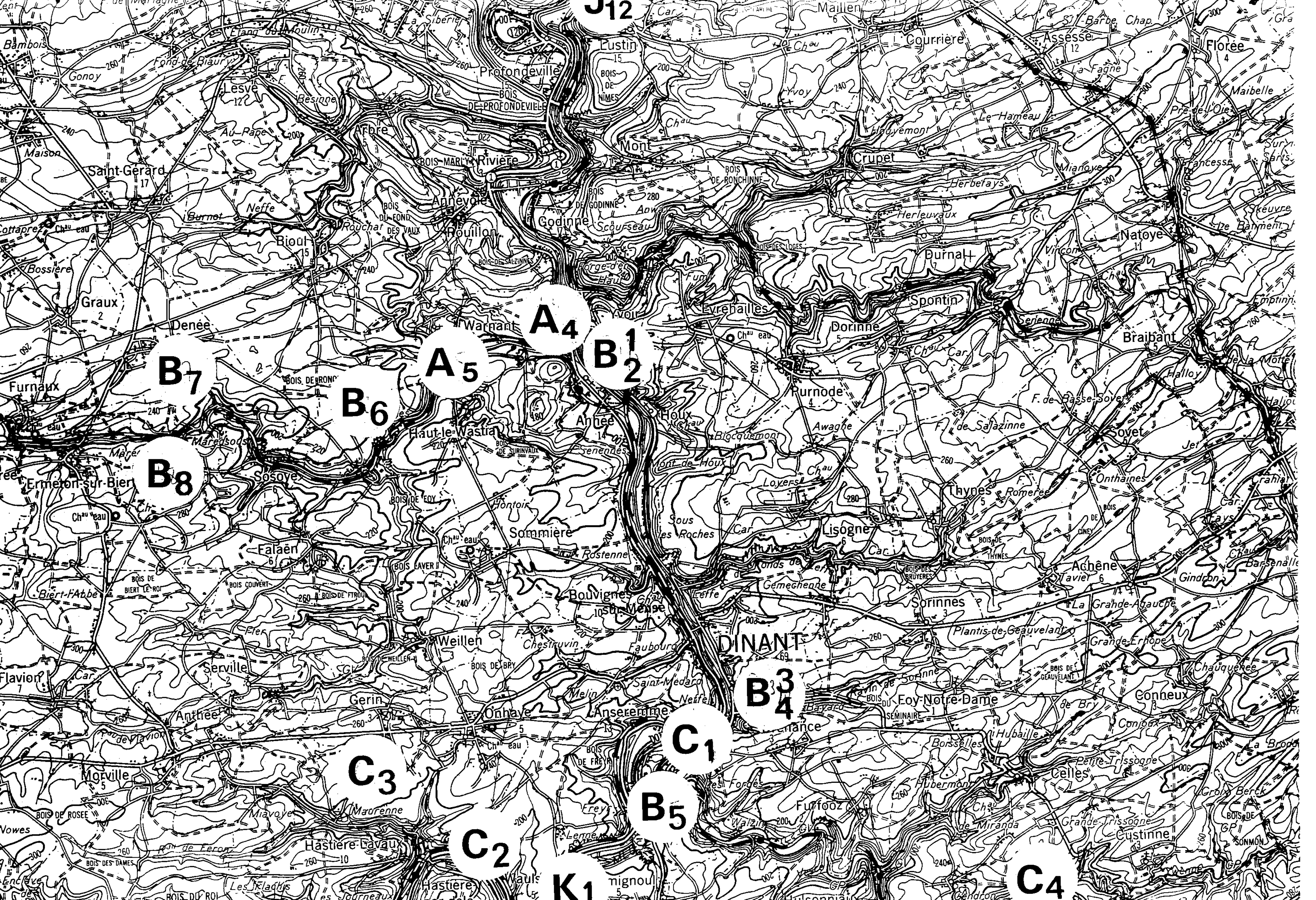
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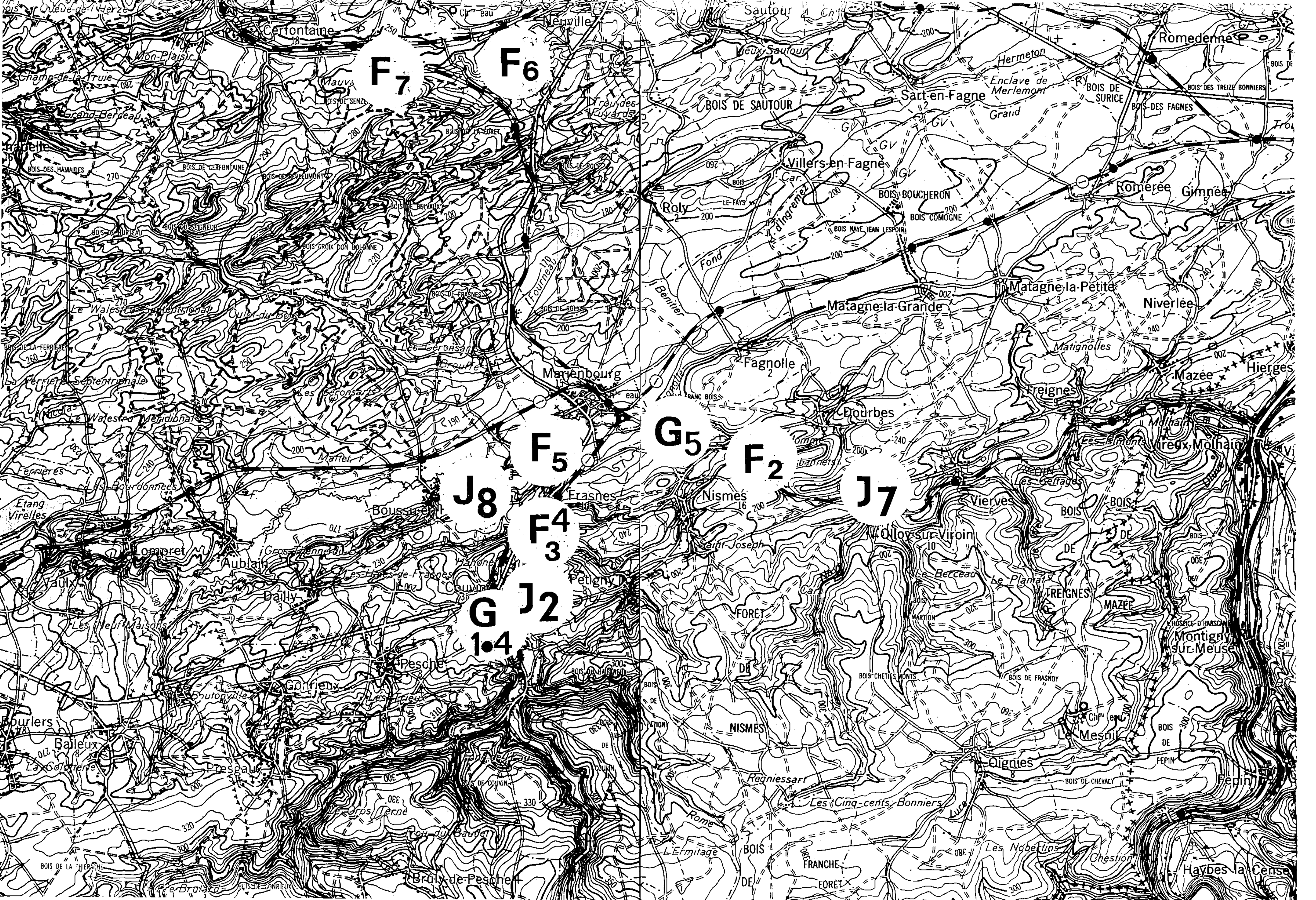
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Oignies
Le Mesnil
Montigny-sur-Meuse
Fepin
Haybes-la-Censé
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NISMES
BOIS DE FRASNOY
BOIS DE CHEVALY
BOIS BOUCHERON
BOIS COMOGNE
BOIS NAYE JEAN LESPOIR
Les Cinq-cents Bonniers
Regniessart
L'Ermitage
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Les Nobeffins
Chestion
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Fond
Benitier
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Le Walestru Méridional
Les Bourdonnées
Etang Virelles
Ferrières
Culot-du-Bois
Les Neuf Maisons
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Mon-Plaisir
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BOIS DU SEIGNEUR
BOIS CROIX DON BOLONNE
BOIS DE FRASNES
BOIS DE ROLY
BOIS DE LA FERRIERE
BOIS DE LA THIERACHE
Enclave de Merlemont
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BOIS DE SURICE
BOIS DES FAGNES
BOIS DES TREIZE BONNIERS
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Matignolles
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MAZÉE
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Le Gros Terne
Trou-du-Baudet


CHARLEROI
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Dampremy
Gilly
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Châtelet
Pont de Loup
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Marcinelle
Couillet
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Mont sur Marchienne
Carnoy
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Aisemont
Aiseau
Vitrival
Le Roux
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INTERNATIONAL SYMPOSIUM ON

NAMUR 1974

BELGIAN MICROPALEONTOLOGICAL LIMITS

FROM EMSIAN TO VISEAN – SEPTEMBER 1st to 10th

EXCURSION K

Guides :

CONIL R.

NOEL B.

GUIDEBOOK

Edited by

J. BOUCKAERT & M. STREEL

- MONIAT -

The large crags at Moniat, situated on the left bank of the R. Meuse opposite Anseremme, expose rocks of Upper Tournaisian and Lower Visean age in Waulsortian facies. At Moniat they attain a thickness of about 350 m while, some 1 600 m to the east - at the Rocher Bayard and the Rocher du Bastion - their lateral equivalents are only about 100 m thick.

As the rocks have been folded into an almost vertical position, the maps (figs 1 and 2) are roughly equivalent to stratigraphic cross-sections.

Lithofacies

In reality, the Waulsortian facies (sensu lato) is a complex of limestones and dolomites which include a biohermal element, namely the Waulsortian "reefs". We propose to distinguish the latter as Waulsortian (sensu stricto). The two main cliffs which front the Meuse are formed by two of these "reefs". The other facies are particularly well-exposed in the area lying a little to the west (fig. 2).

Four lithofacies have been distinguished of which three are time-equivalents (= Waulsortian s.l.) :

(1) Black limestones : Fine-grained and regularly stratified, these limestones apparently post-date "reef" formation. Their contact with the other lithofacies is abrupt.

(2) Waulsortian (s.l.)

(a) Waulsortian limestones (s.s.) : These biohermal rocks, often massive in structure, are generally pale-grey biomicrites with bands and patches of sparry calcite ("veines bleues") often associated with bryozoans.

(b) Bioclastic limestones : These are well - to poorly - bedded pale-grey to beige biomicrites which are sometimes very crinoidal.

(c) Dolomites : Pearl grey in colour and medium - to coarse - grained, these are the dolomitised equivalents of lithofacies 2 (a) and 2 (b).

Biostratigraphy

With the aid of the microfaunas (foraminiferous and conodonts) three biostratigraphic limits have been distinguished.

	Foraminifera	Conodonts	
Appearance of :			
1)	Tetrataxis sp. Palaeospiroplectammina diversa N.TSCH.	Doliognathus latus BRANSON & MEHL Scaliognathus anchoralis BRANSON & MEHL	Tn3c partim
2)	Eoparastafella sp. Pachysphaerina pachysphaerica (PRON.) Dainella sp.	Gnathodus cf. homopunctatus ZIEGLER	V1a
3)	Archaediscidae		

The D. latus sub-zone has only been identified at one point (indicated by an arrow on fig. 2). Elsewhere, this sub-zone is never known to exceed 1 m 50 in thickness.

Comparaison of the Moniat sections with those of the Rocher Bayard and Rocher du Bastion shows that the thickness of the sequence (Tn3c partim) lying between D. latus and the appearance of the Visean microfauna remains

roughly constant. In contrast, the V1a varies from 79 m at Moniat to 30 m at Rocher du Bastion. Petrographic studies confirm that the upper Tn3c and the V1a of this area represent rather different sedimentary regimes - although these differences are not always apparent in the field.

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BIOSTRATIGRAPHIC MAP

for the region between Moniat and the Rocher Bayard

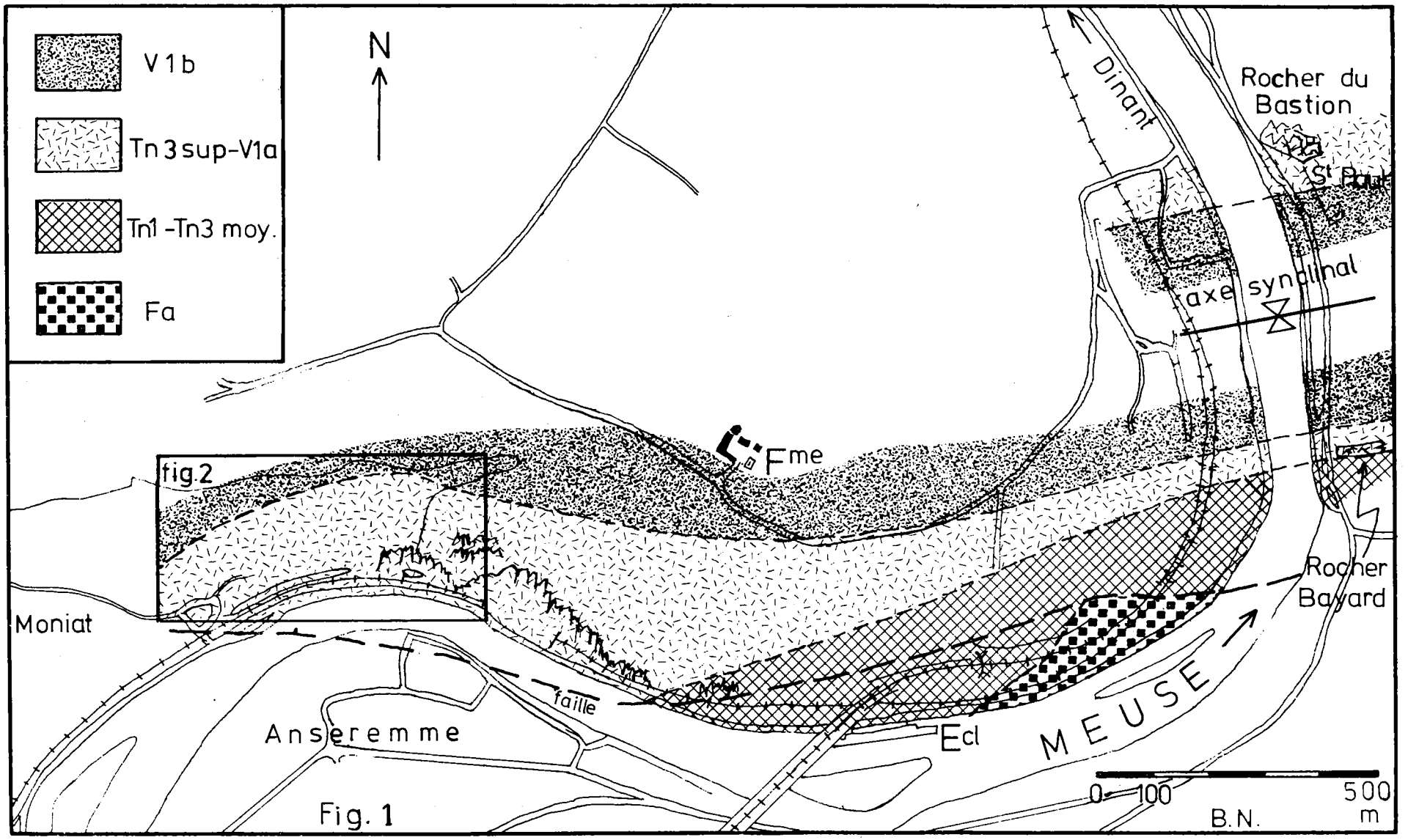


Fig. 1

MONIAT

Geological map

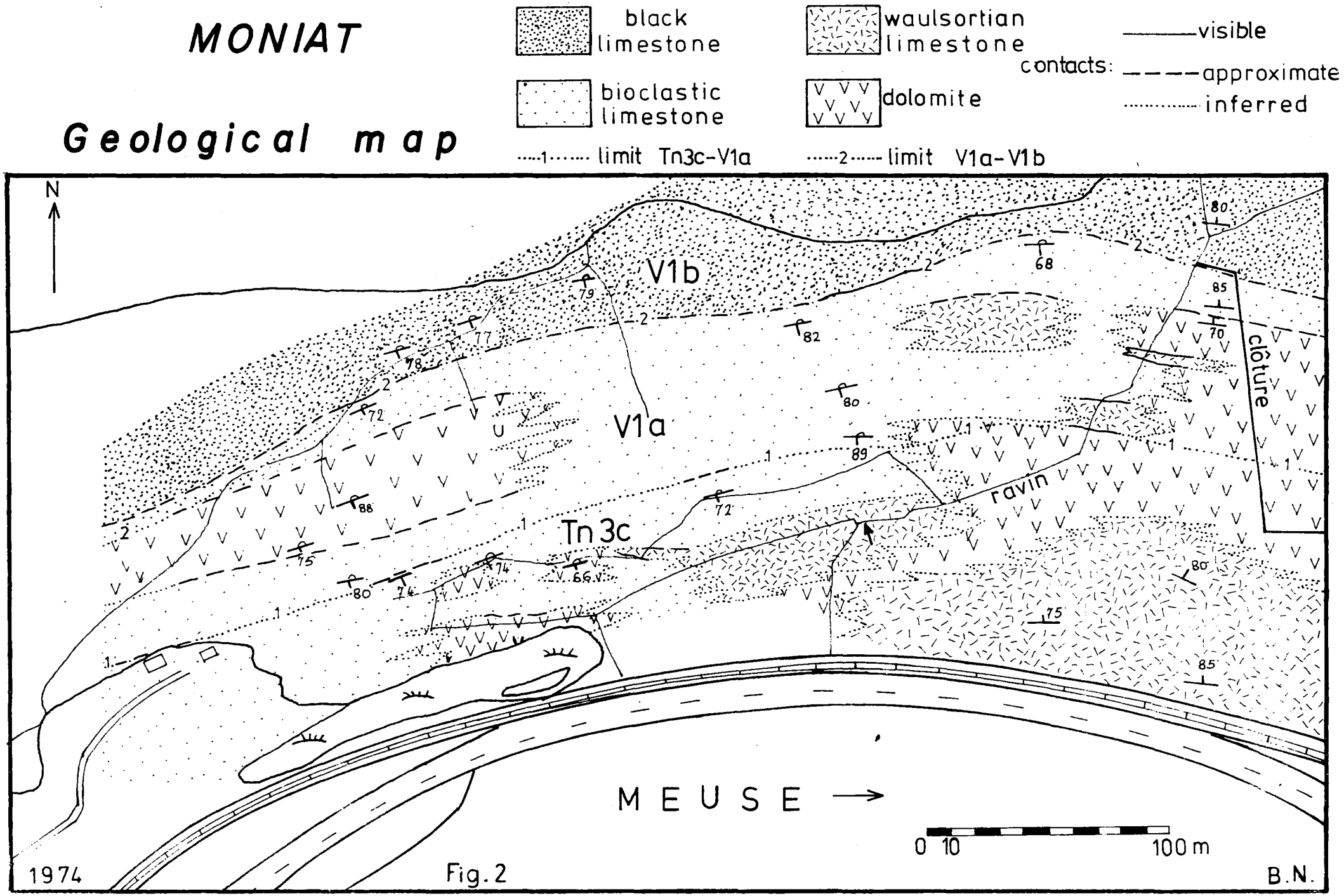
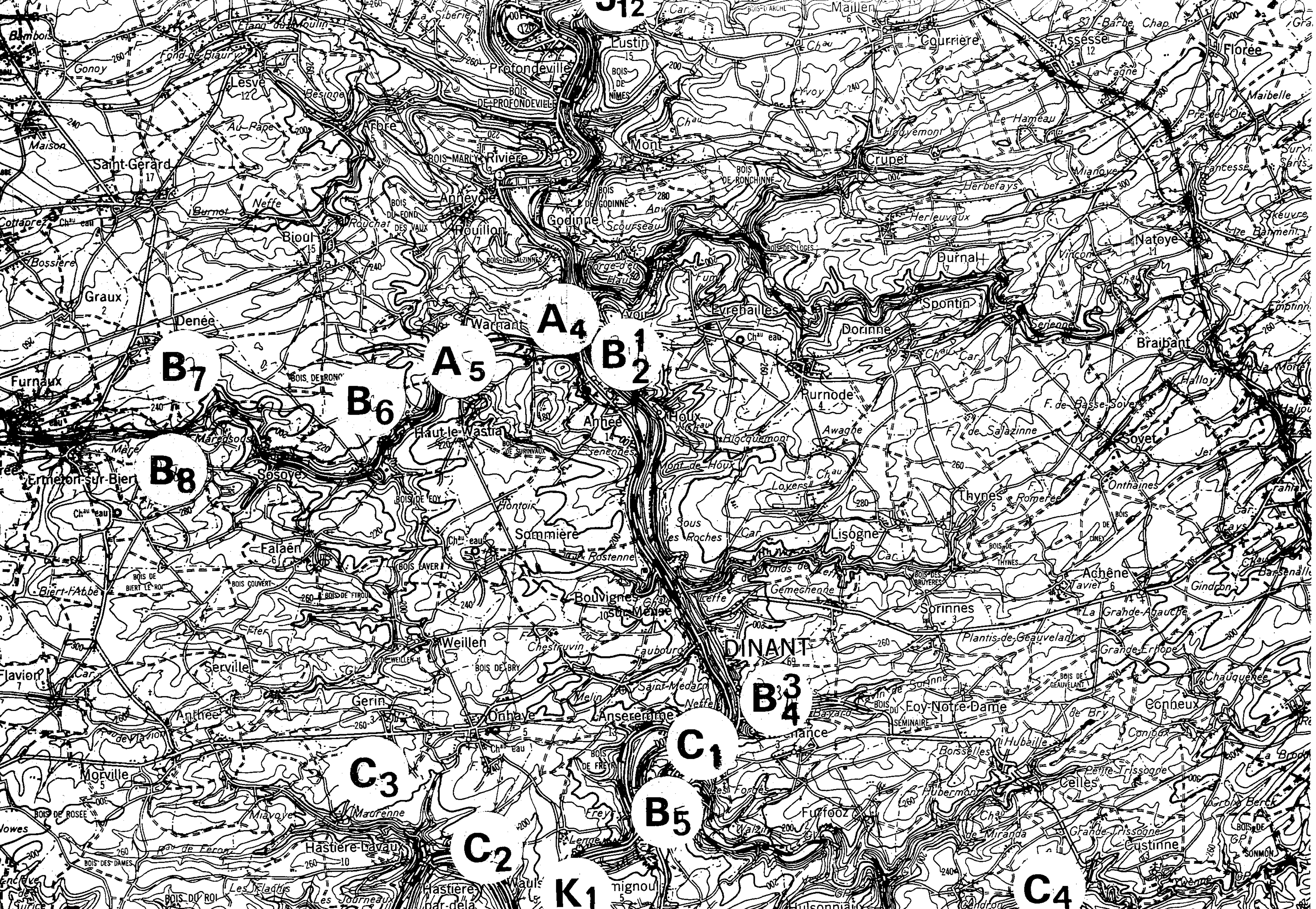


Fig. 2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Leffe
Gemechenne
Awagne
Loyers
Mailleň